Z A K O N

O POTVRĐIVANJU IZMENA I DOPUNA SPORAZUMA O MEĐUNARODNOM PREVOZU LAKOKVARLJIVIH NAMIRNICA I SPECIJALNIM SREDSTVIMA ZA NJIHOV PREVOZ (ATP)

Član 1.

Potvrđuju se izmene i dopune Sporazuma o međunarodnom prevozu lakokvarljivih namirnica i specijalnim sredstvima za njihov prevoz (ATP), verzija 2022. godine, sačinjena u Ženevi aprila 2022. godine, na engleskom, francuskom i ruskom jeziku, koja važi od 1. juna 2022. godine.

Član 2.

Tekst izmena i dopuna Sporazuma o međunarodnom prevozu lakokvarljivih namirnica i specijalnim sredstvima za njihov prevoz (ATP), verzija 2022. godine, u originalu na engleskom i u prevodu na srpski jezik glasi:

AGREEMENT ON THE INTERNATIONAL CARRIAGE OF PERISHABLE FOODSTUFFS AND ON THE SPECIAL EQUIPMENT TO BE USED FOR SUCH CARRIAGE (ATP)

THE CONTRACTING PARTIES,

DESIROUS of improving the conditions of preservation of the quality of perishable foodstuffs during their carriage, particularly in international trade,

CONSIDERING that the improvement of those conditions is likely to promote the expansion of trade in perishable foodstuffs,

HAVE AGREED as follows:

Chapter I

SPECIAL TRANSPORT EQUIPMENT

Article 1

For the international carriage of perishable foodstuffs, equipment shall not be designated as ‘insulated’, ‘refrigerated’, ‘mechanically refrigerated’, ‘heated’ or ‘mechanically refrigerated and heated’ equipment unless it complies with the definitions and standards set forth in annex 1 to this Agreement.

Article 2

The Contracting Parties shall take the measures necessary to ensure that the equipment referred to in article 1 of this Agreement is inspected and tested for compliance with the said standards in conformity with the provisions of annex 1, appendices 1, 2, 3 and 4, to this Agreement. Each Contracting Party shall recognize the validity of certificates of compliance issued in conformity with annex 1, appendix 1, paragraph 3 to this Agreement by the competent authority of another Contracting Party. Each Contracting Party may recognize the validity of certificates of compliance issued in conformity with the requirements of annex 1, appendices 1 and 2, to this Agreement by the competent authority of a State not a Contracting Party.

Chapter II

USE OF SPECIAL TRANSPORT EQUIPMENT FOR THE INTERNATIONAL CARRIAGE OF CERTAIN PERISHABLE FOODSTUFFS

Article 3

1. The provisions of article 4 of this Agreement shall apply to all carriage, whether for hire or reward or for own account, carried out exclusively subject to the provisions of paragraph 2 of this article by rail, by road or by a combination of the two, of

- quick (deep)-frozen and frozen foodstuffs, and of

- foodstuffs referred to in annex 3 to this Agreement even if they are neither quick (deep)-frozen nor frozen,

if the point at which the goods are, or the equipment containing them is, loaded on to a rail or road

vehicle and the point at which the goods are, or the equipment containing them is, unloaded from that vehicle are in two different States and the point at which the goods are unloaded is situated in the territory of a Contracting Party.

In the case of carriage entailing one or more sea crossings other than sea crossings as referred to in paragraph 2 of this article, each land journey shall be considered separately.

2. The provisions of paragraph 1 of this article shall likewise apply to sea crossings of less than 150 km on condition that the goods are shipped in equipment used for the land journey or journeys without transloading of the goods and that such crossings precede or follow one or more land journeys as referred to in paragraph 1 of this article or take place between two such land journeys.

3. Notwithstanding the provisions of paragraphs 1 and 2 of this article, the Contracting Parties need not apply the provisions of article 4 of this Agreement to the carriage of foodstuffs not intended for human consumption.

Article 4

1. For the carriage of the perishable foodstuffs specified in annexes 2 and 3 to this Agreement, the equipment referred to in article 1 of this Agreement shall be used unless the temperatures to be anticipated throughout carriage render this requirement manifestly unnecessary for the purpose of maintaining the temperature conditions specified in annexes 2 and 3 to this Agreement. The equipment shall be so selected and used that the temperature conditions prescribed in the said annexes can be complied with throughout carriage. Furthermore, all appropriate measures shall be taken, more particularly as regards the temperature of the foodstuffs at the time of loading and as regards icing or re-icing during the journey or other necessary operations. Nevertheless, the provisions of this paragraph shall apply only in so far as they are not incompatible with international undertakings in the matter of international carriage arising for the Contracting Parties by virtue of conventions in force at the time of the entry into force of this Agreement or by virtue of conventions substituted for them.

2. If during carriage under this Agreement the provisions of paragraph 1 of this article have not been complied with,

a) the foodstuffs may not be disposed of in the territory of a Contracting Party after completion of carriage unless the competent authorities of that Contracting Party deem it compatible with the requirements of public health to authorize such disposal and unless such conditions as the authorities may attach to the authorization when granting it are fulfilled; and

b) every Contracting Party may, by reason of the requirements of public health or zooprophylaxis and in so far as it is not incompatible with the other international undertakings referred to in the last sentence of paragraph 1 of this article, prohibit the entry of the foodstuffs into its territory or make their entry subject to such conditions as it may determine.

3. Compliance with the provisions of paragraph 1 of this article shall be required of carriers for hire or reward only in so far as they have undertaken to procure or provide services intended to ensure such compliance and if such compliance depends on the performance of those services. If other persons, whether individuals or corporate bodies, have undertaken to procure or provide services intended to ensure compliance with the provisions of this Agreement, they shall be required to ensure such compliance in so far as it depends on performance of the services they have undertaken to procure or provide.

4. During carriage which is subject to the provisions of this Agreement and for which the loading point is situated in the territory of a Contracting Party, responsibility for compliance with the requirements of paragraph 1 of this article shall rest, subject to the provisions of paragraph 3 of this article,

- in the case of transport for hire or reward, with the person, whether an individual or a corporate body, who is the consignor according to the transport document or, in the absence of a transport document, with the person, whether an individual or a corporate body, who has entered into the contract of carriage with the carrier;

- in other cases with the person, whether an individual or a corporate body, who performs carriage.

Chapter III

MISCELLANEOUS PROVISIONS

Article 5

The provisions of this Agreement shall not apply to carriage in containers classified as thermal maritime by land without transloading of the goods where such carriage is preceded or followed by a sea crossing other than a sea crossing as referred to in article 3, paragraph 2, of this Agreement.

Article 6

1. Each Contracting Party shall take all appropriate measures to ensure observance of the provisions of this Agreement. The competent administrations of the Contracting Parties shall keep one another informed of the general measures taken for this purpose.

2. If a Contracting Party discovers a breach committed by a person residing in the territory of another Contracting Party, or imposes a penalty upon such a person, the administration of the first Party shall inform the administration of the other Party of the breach discovered and of the penalty imposed.

Article 7

The Contracting Parties reserve the right to enter into bilateral or multilateral agreements to the effect that provisions applicable to special equipment and provisions applicable to the temperatures at which certain foodstuffs are required to be maintained during carriage may, more particularly by reason of special climatic conditions, be more stringent than those prescribed in this Agreement. Such provisions shall apply only to international carriage between Contracting Parties which have concluded bilateral or multilateral agreements as referred to in this article. Such agreements shall be transmitted to the Secretary-General of the United Nations, who shall communicate them to Contracting Parties to this Agreement which are not signatories of the said agreements.

Article 8

Failure to observe the provisions of this Agreement shall not affect either the existence or the validity of contracts entered into for the performance of carriage.

Chapter IV

FINAL PROVISIONS

Article 9

1. States members of the Economic Commission for Europe and States admitted to the Commission in a consultative capacity under paragraph 8 of the Commission's terms of reference may become Contracting Parties to this Agreement

a) by signing it;

b) by ratifying it after signing it subject to ratification; or

c) by acceding to it.

2. States which may participate in certain activities of the Economic Commission for Europe under paragraph 11 of the Commission's terms of reference may become Contracting Parties to this Agreement by acceding thereto after its entry into force.

3. This Agreement shall be open for signature until 31 May 1971 inclusive. Thereafter, it shall be open for accession.

4. Ratification or accession shall be effected by the deposit of an instrument with the Secretary-General of the United Nations.

Article 10

1. Any State may at the time of signing this Agreement without reservation as to ratification or of depositing its instrument of ratification or accession or at any time thereafter declare by notification addressed to the Secretary-General of the United Nations that the Agreement does not apply to carriage performed in any or in a particular one of its territories situated outside Europe. If notification as aforesaid is made after the entry into force of the Agreement in respect of the notifying State the Agreement shall, ninety days after the date on which the Secretary-General has received the notification, cease to apply to carriage in the territory or territories named in that notification. New Contracting Parties acceding to ATP as from 30 April 1999 and applying paragraph 1 of this article shall not be entitled to enter any objection to draft amendments in accordance with the procedure provided for in article 18, paragraph 2.

2. Any State which has made a declaration under paragraph 1 of this article may at any time thereafter declare by notification addressed to the Secretary-General of the United Nations that the Agreement will be applicable to carriage performed in a territory named in the notification made under paragraph 1 of this article and the Agreement shall become applicable to carriage in that territory one hundred and eighty days after the date on which the Secretary-General has received that notification.

Article 11

1. This Agreement shall come into force one year after five of the States referred to in its article 9, paragraph 1, have signed it without reservation as to ratification or have deposited their instruments of ratification or accession.

2. With respect to any State which ratifies, or accedes to, this Agreement after five States have

signed it without reservation as to ratification or have deposited their instruments of ratification or accession, this Agreement shall enter into force one year after the said State has deposited its instrument of ratification or accession.

Article 12

1. Any Contracting Party may denounce this Agreement by giving notice of denunciation to the Secretary- General of the United Nations.

2. The denunciation shall take effect fifteen months after the date on which the Secretary-General received the notice of denunciation.

Article 13

This Agreement shall cease to have effect if the number of Contracting Parties is less than five throughout any period of twelve consecutive months after its entry into force.

Article 14

1. Any State may at the time of signing this Agreement without reservation as to ratification or of depositing its instrument of ratification or accession or at any time thereafter declare by notification addressed to the Secretary-General of the United Nations that this Agreement will be applicable to all or any of the territories for the international relations of which that State is responsible. This Agreement shall be applicable to the territory or territories named in the notification as from the ninetieth day after receipt of the notice by the Secretary-General or, if on that day the Agreement has not yet entered into force, as from its entry into force.

2. Any State which has made a declaration under paragraph 1 of this article making this Agreement applicable to a territory for whose international relations it is responsible may denounce the Agreement separately in respect of that territory in conformity with article 12 hereof.

Article 15

1. Any dispute between two or more Contracting Parties concerning the interpretation or application of this Agreement shall so far as possible be settled by negotiation between them.

2. Any dispute which is not settled by negotiation shall be submitted to arbitration if any one of the Contracting Parties concerned in the dispute so requests and shall be referred accordingly to one or more arbitrators selected by agreement between those Parties. If within three months from the date of the request for arbitration, the Parties concerned in the dispute are unable to agree on the selection of an arbitrator or arbitrators, any of those Parties may request the Secretary-General of the United Nations to designate a single arbitrator to whom the dispute shall be referred for decision.

3. The decision of the arbitrator or arbitrators designated under the preceding paragraph shall be binding on the Contracting Parties concerned in the dispute.

Article 16

1. Any State may, at the time of signing, ratifying, or acceding to, this Agreement, declare that it does not consider itself bound by article 15, paragraphs 2 and 3 of this Agreement. The other Contracting Parties shall not be bound by these paragraphs with respect to any Contracting Party which has entered such a reservation.

2. Any Contracting Party which has entered a reservation under paragraph 1 of this article may at any time withdraw the reservation by notification addressed to the Secretary-General of the United Nations.

3. With the exception of the reservation provided for in paragraph 1 of this article, no reservation to this Agreement shall be permitted.

Article 17

1. After this Agreement has been in force for three years, any Contracting Party may, by notification addressed to the Secretary-General of the United Nations, request that a conference be convened for the purpose of revising this Agreement. The Secretary-General shall notify all Contracting Parties of the request and a revision conference shall be convened by the Secretary-General if, within a period of four months from the date of the notification sent by the Secretary-General, not less than one third of the Contracting Parties signify their assent to the request.

2. If a conference is convened in pursuance of paragraph 1 of this article, the Secretary-General shall so advise all the Contracting Parties and invite them to submit within a period of three months, the proposals which they wish the conference to consider. The Secretary-General shall circulate the provisional agenda for the conference, together with the text of such proposals, to all Contracting Parties not less than three months before the date on which the conference is to open.

3. The Secretary-General shall invite to any conference convened in pursuance of this article all the countries referred to in article 9, paragraph 1, of this Agreement, and also the countries which have become Contracting Parties under the said article 9, paragraph 2.

Article 18

1. Any Contracting Party may propose one or more amendments to this Agreement. The text of any proposed amendment shall be communicated to the Secretary-General of the United Nations, who shall communicate it to all Contracting Parties and bring it to the notice of all the other States referred to in article 9, paragraph 1, of this Agreement.

The Secretary-General may also propose amendments to this Agreement or to its annexes which have been transmitted to him by the Working Party on the Transport of Perishable Foodstuffs of the Inland Transport Committee of the Economic Commission for Europe.

2. Within a period of six months following the date on which the proposed amendment is communicated by the Secretary-General, any Contracting Party may inform the Secretary-General

a) that it has an objection to the amendment proposed, or

b) that, although it intends to accept the proposal, the conditions necessary for such acceptance are not yet fulfilled in its country.

3. If a Contracting Party sends the Secretary-General a communication as provided for in paragraph 2 (b) of this article, it may, so long as it has not notified the Secretary-General of its acceptance, submit an objection to the proposed amendment within a period of nine months following the expiry of the period of six months prescribed in respect of the initial communication.

4. If an objection to the proposed amendment is stated in accordance with the terms of paragraphs 2 and 3 of this article, the amendment shall be deemed not to have been accepted and

shall be of no effect.

5. If no objection to the proposed amendment has been stated in accordance with paragraphs 2 and 3 of this article, the amendment shall be deemed to have been accepted on the date specified below:

a) if no Contracting Party has sent a communication to the Secretary-General in accordance with paragraph 2 (b) of this article, on the expiry of the period of six months referred to in paragraph 2 of this article;

b) if at least one Contracting Party has sent a communication to the Secretary-General in accordance with paragraph 2 (b) of this article, on the earlier of the following two dates:

- the date by which all the Contracting Parties which sent such communications have notified the Secretary-General of their acceptance of the proposed amendment, subject however to the proviso that if all the acceptances were notified before the expiry of the period of six months referred to in paragraph 2 of this article the date shall be the date of expiry of that period;

- the date of expiry of the period of nine months referred to in paragraph 3 of this article.

6. Any amendment deemed to be accepted shall enter into force six months after the date on which it was deemed to be accepted.

7. The Secretary-General shall as soon as possible inform all Contracting Parties whether an objection to the proposed amendment has been stated in accordance with paragraph 2 (a) of this article and whether one or more Contracting Parties have sent him a communication in accordance with paragraph 2 (b) of this article. If one or more Contracting Parties have sent him such a communication, he shall subsequently inform all the Contracting Parties whether the Contracting Party or Parties which have sent such a communication raise an objection to the proposed amendment or accept it.

8. Independently of the amendment procedure laid down in paragraphs 1 to 6 of this article, the annexes and appendices to this Agreement may be modified by agreement between the competent administrations of all the Contracting Parties. If the administration of a Contracting Party has stated that under its national law its agreement is contingent on special authorization or on the approval of a legislative body, the consent of the Contracting Party concerned to the modification of an annex shall not be deemed to have been given until the Contracting Party has notified the Secretary- General that the necessary authorization or approval has been obtained. The agreement between the competent administrations may provide that, during a transitional period, the old annexes shall remain in force, wholly or in part, concurrently with the new annexes. The Secretary-General shall specify the date of the entry into force of the new texts resulting from such modifications.

Article 19

In addition to communicating to them the notifications provided for in articles 17 and 18 of this Agreement, the Secretary-General of the United Nations shall notify the States referred to in article 9, paragraph 1, of this Agreement and the States which have become Contracting Parties under article 9, paragraph 2, of:

a) signatures, ratifications and accessions under article 9;

b) the dates of entry into force of this Agreement pursuant to article 11;

c) denunciations under article 12;

d) the termination of this Agreement under article 13;

e) notifications received under articles 10 and 14;

f) declarations and notifications received under article 16, paragraphs 1 and 2;

g) the entry into force of any amendment pursuant to article 18.

Article 20

After 31 May 1971, the original of this Agreement shall be deposited with the Secretary-General of the United Nations, who shall transmit certified true copies to each of the States mentioned in article 9, paragraphs 1 and 2, of this Agreement.

IN WITNESS WHEREOF, the undersigned, being duly authorized thereto, have signed this Agreement.

DONE at Geneva, this first day of September, one thousand nine hundred and seventy, in a single copy, in the English, French and Russian languages, the three texts being equally authentic.

Annex 1

DEFINITIONS OF AND STANDARDS FOR SPECIAL EQUIPMENT [1] FOR THE CARRIAGE OF PERISHABLE FOODSTUFFS

1. **Insulated equipment.** Equipment of which the body[2] is built with rigid* insulating walls, doors, floor and roof, by which heat exchanges between the inside and outside of the body can be so limited that the overall coefficient of heat transfer (*K* coefficient) is such that the equipment is assignable to one or other of the following two categories:

   I_N = Normally insulated equipment specified by: – a *K* coefficient equal to or less than 0.70 W/m^2°C;

   I_R = Heavily insulated equipment specified by: – a *K* coefficient equal to or less than 0.40 W/m^2°C
   and by side-walls with a thickness of at least 45 mm for transport equipment of a width greater than 2.50 m.

   The definition of the *K* coefficient and a description of the method to be used in measuring it are given in appendix 2 to this annex.

2. **Refrigerated equipment.** Insulated equipment which, using a source of cold (natural ice, with or without the addition of salt; eutectic plates; dry ice, with or without sublimation control; liquefied gases, with or without evaporation control, etc.) other than a mechanical or "absorption" unit, is capable, with a mean outside temperature of +30 °C, of lowering the temperature inside the empty body to, and thereafter maintaining it:

   At +7 °C maximum in the case of class A;

   At -10 °C maximum in the case of class B;

   At -20 °C maximum in the case of class C; and

   At 0 °C maximum in the case of class D.

   If such equipment includes one or more compartments, receptacles or tanks for the refrigerant, the said compartments, receptacles or tanks shall:

   - be capable of being filled or refilled from the outside; and
   - have a capacity in conformity with the provisions of annex I, appendix 2, paragraph 3.1.3.

   The *K* coefficient of refrigerated equipment of classes B and C shall in every case be equal to or less than 0.40 W/m^2°C.

3. **Mechanically refrigerated equipment.** Insulated equipment either fitted with its own refrigerating appliance, or served jointly with other units of transport equipment by such an appliance (fitted with either a mechanical compressor, or an "absorption" device, etc.). The appliance shall be capable, with a mean outside temperature of +30 °C, of lowering the temperature *Ti* inside the empty body to, and thereafter maintaining it continuously in the following manner at:

In the case of classes A, B and C, any desired practically constant inside temperature *Ti* in conformity with the standards defined below for the three classes:

Class A. Mechanically refrigerated equipment fitted with a refrigerating appliance such that *Ti* may be chosen between +12 °C and 0 °C inclusive;

Class B. Mechanically refrigerated equipment fitted with a refrigerating appliance such that *Ti* may be chosen between +12 °C and -10 °C inclusive;

Class C. Mechanically refrigerated equipment fitted with a refrigerating appliance such that *Ti* may be chosen between +12 °C and -20 °C inclusive.

In the case of classes D, E and F a fixed practically constant inside temperature *Ti* in conformity with the standards defined below for the three classes:

Class D. Mechanically refrigerated equipment fitted with a refrigerating appliance such that *Ti* is equal to or less than 0 °C;

Class E. Mechanically refrigerated equipment fitted with a refrigerating appliance such that *Ti* is equal to or less than -10 °C;

Class F. Mechanically refrigerated equipment fitted with a refrigerating appliance such that *Ti* is equal to or less than -20 °C. The *K* coefficient of equipment of classes B, C, E and F shall in every case be equal to or less than 0.40 W/m^2°C.

4. **Heated equipment.** Insulated equipment, which is capable of raising the inside temperature of the empty body to, and thereafter maintaining it for not less than 12 hours without renewal of supply at, a practically constant value of not less than +12 °C when the mean outside temperature, is as indicated below:

- –10 °C in the case of class A heated equipment;
- –20 °C in the case of class B heated equipment;
- –30 °C in the case of class C heated equipment;
- –40 °C in the case of class D heated equipment.

Heat producing appliances shall have a capacity in conformity with the provisions of annex 1, appendix 2, paragraphs 3.3.1 to 3.3.5.

The *K* coefficient of equipment of classes B, C and D shall in every case be equal to or less than 0.40 W/m^2°C.

5. **Mechanically refrigerated and heated equipment.** Insulated equipment either fitted with its own refrigerating appliance, or served jointly with other units of transport equipment by such an appliance (fitted with either a mechanical compressor, or an ‘absorption’ device, etc.), and heating (fitted with electric heaters, etc.) or refrigerating-heating units capable both of lowering the temperature Ti inside the empty body and thereafter maintaining it continuously, and of raising the temperature and thereafter maintaining it for not less than 12 hours without renewal of supply at a practically constant value, as indicated below.

Class A: Ti may be chosen between +12 °C and 0 °C inclusive at a mean outside temperature between
-10 °C and +30 °C.

Class B: Ti may be chosen between +12 °C and 0 °C inclusive at a mean outside temperature between
-20 °C and +30 °C.

Class C: Ti may be chosen between +12 °C and 0 °C inclusive at a mean outside temperature between
-30 °C and +30 °C.

Class D: Ti may be chosen between +12 °C and 0 °C inclusive at a mean outside temperature between
-40 °C and +30 °C.

Class E: Ti may be chosen between +12 °C and -10 °C inclusive at a mean outside temperature between
-10 °C and +30 °C.

Class F: Ti may be chosen between +12 °C and -10 °C inclusive at a mean outside temperature between
-20 °C and +30 °C.

Class G: Ti may be chosen between +12 °C and -10 °C inclusive at a mean outside temperature between
-30 °C and +30 °C.

Class H: Ti may be chosen between +12 °C and -10 °C inclusive at a mean outside temperature between
-40 °C and +30 °C.

Class I: Ti may be chosen between +12 °C and -20 °C inclusive at a mean outside temperature between
-10 °C and +30 °C.

Class J: Ti may be chosen between +12 °C and -20 °C inclusive at a mean outside temperature between
-20 °C and +30 °C.

Class K: Ti may be chosen between +12 °C and -20 °C inclusive at a mean outside temperature between
-30 °C and +30 °C.

Class L: Ti may be chosen between +12 °C and -20 °C inclusive at a mean outside temperature between
-40 °C and +30 °C.

The *K* coefficient of equipment of classes B, C, D, E, F, G, H, I, J, K and L shall in every case be equal to or less than 0.40 W/m²°C.

Heat producing or refrigerating-heating appliances when in heating mode shall have a capacity in conformity with the provisions of annex 1, appendix 2, paragraphs 3.4.1 to 3.4.5.

6. Transitional measures

6.1 Insulated bodies with non-rigid walls which first came into service before the amendment of paragraph 1 of annex 1 entered into force on 6 January 2018 may continue to be used for the carriage of perishable foodstuffs of the appropriate classification until the validity of the certificate of compliance expires. The validity of the certificate shall not be extended.

7. Definitions

Equipment means an assembly of parts forming an insulated body and its supportive structure needed for carriage on road and rail. Thermal appliances may be part of the assembly.

Heating appliance means a thermal appliance that generates thermal energy to increase (heat) the temperature inside.

Mechanically heated and refrigerated appliance means a mechanical refrigerating appliance that is able to decrease (cool) or increase (heat) the temperature inside the equipment that is tested to certify both the capacity to cool and to heat.

Mechanically refrigerating appliance means a thermal appliance that generates thermal energy to decrease (cool) the temperature inside the equipment by a mechanical drive system.

Refrigerating appliance means a thermal appliance that generates thermal energy to decrease (cool) the temperature inside the equipment by melting, evaporation or sublimation of for example natural ice, brine (eutectic) liquefied gas or dry ice.

Thermal appliance means a device to generate thermal energy, to decrease (cool) or increase (heat) the temperature inside the equipment.

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[1] *Wagons, lorries, trailers, semi-trailers, containers and other similar equipment.*

[2] *In the case of tank equipment, the term "body" means under this definition, the tank itself.*

* *Rigid in this case refers to non-flexible continuous or non-continuous surfaces, for example full solid walls or roller-shutter doors.*

Annex 1, Appendix 1

PROVISIONS RELATING TO THE CHECKING OF INSULATED, REFRIGERATED, MECHANICALLY REFRIGERATED, HEATED OR MECHANICALLY REFRIGERATED AND HEATED EQUIPMENT FOR COMPLIANCE WITH THE STANDARDS

1. Checks for conformity with the standards prescribed in this annex shall be made:

   a) before equipment enters into service;

   b) periodically, at least once every six years; and

   c) whenever required by the competent authority.

   Except in the cases provided for in appendix 2, sections 5 and 6, to this annex, the checks shall be made at a testing station designated or approved by the competent authority of the country in which the equipment is registered or recorded, unless, in the case of the check referred to in (a) above, a check has already been made on the equipment itself or on its prototype in a testing station designated or approved by the competent authority of the country in which the equipment was manufactured.

2. The methods and procedures to be used in checking for compliance with the standards are described in appendix 2 to this annex.

3. A certificate of compliance with the standards shall be issued by the competent authority of the country in which the equipment is to be registered or recorded. This certificate shall conform to the model reproduced in appendix 3 to this annex.

   The certificate of compliance shall be carried on the equipment during carriage and be produced whenever so required by the control authorities. However, if a certification plate of compliance, as reproduced in appendix 3 to this annex, is fixed to the equipment, the certification plate of compliance shall be recognized as equivalent to a certificate of compliance. A certification plate of compliance may be fixed to the equipment only when a valid certificate of compliance is available. Certification plates of compliance shall be removed as soon as the equipment ceases to conform to the standards laid down in this annex.

   In the case of equipment transferred to another country, which is a Contracting Party to ATP, it shall be accompanied by the following documents so that the competent authority of the country in which the equipment is to be registered or recorded can issue a certificate of compliance:

   a) in all cases, the test report of the equipment itself or, in the case of serially produced equipment, of the reference equipment;

   b) in all cases, the certificate of compliance issued by the competent authority of the country of manufacture or, for equipment in service, the competent authority of the country of registration. This certificate will be treated as a provisional certificate if necessary with a maximum validity of six months. For Multi Temperature, Multi Compartment equipment also the declaration of conformity (see 7.3.6 of annex I, appendix 2) shall be provided;

   c) in the case of serially produced equipment, the technical specification of the

equipment to be certified as issued by the manufacturer of the equipment or his duly accredited representative (this specification shall cover the same items as the descriptive pages concerning the equipment which appear in the test report and shall be drawn up in at least one of the official languages). For Multi Temperature, Multi Compartment equipment also a calculation sheet (see 7.3.6 of annex I, appendix 2) based on the iterative method shall be provided.

In the case of equipment transferred after it has been in use, the equipment may be subject to a visual inspection to confirm its identity before the competent authority of the country, in which it is to be registered or recorded, issues a certificate of compliance.

For a batch of identical serially produced insulated equipment (containers) having an internal volume of less than 2 m^3, a certificate of compliance for the batch may be issued by the competent authority. In such cases the identification numbers of all the insulated equipment, or the first and the last identification numbers of the series, shall be indicated on the certificate of compliance instead of the serial number of each individual unit. In that case, the insulated equipment listed in that certificate shall be fitted with a certification plate of compliance as described in Annex 1, Appendix 3 B issued by the competent authority.

In the case of transfer of this insulated equipment (containers) to another country which is a Contracting Party to this Agreement in order to be registered or recorded there, the competent authority of the country of the new registration or recording may provide an individual certificate of compliance based on the original certificate of compliance established for the whole batch.

4. Distinguishing marks and particulars shall be affixed to the equipment in conformity with the provisions of appendix 4 to this annex. They shall be removed as soon as the equipment ceases to conform to the standards laid down in this annex.

5. The insulated bodies of ‘insulated’, ‘refrigerated’, ‘mechanically refrigerated’, ‘heated’ or ‘mechanically refrigerated and heated’ transport equipment and their thermal appliances shall each bear a durable manufacturer’s plate firmly affixed by the manufacturer in a conspicuous and readily accessible position on a part not subject to replacement in use. It shall be able to be checked easily and without the use of tools. For insulated bodies, the manufacturer’s plate shall be on the outside of the body. The manufacturer’s plate shall show clearly and indelibly at least the following particulars[3]:

Country of manufacture or letters used in international road traffic; Name of manufacturer or company;

Model (figures and/or letters);

Serial number;

Month and year of manufacture.

6. a) New equipment of a specific type serially produced may be approved by testing one unit of that type. If the unit tested meets the class specification, the resulting test report shall be regarded as a Type Approval Certificate. This certificate shall expire at the end of a period of six years beginning from the date of completion of the test.

The date of expiry of test reports shall be stated in months and years.

b) The competent authority shall take steps to verify that production of other units is in conformity with the approved type. For this purpose it may check by testing sample units drawn at random from the production series.

c) A unit shall not be regarded as being of the same type as the unit tested unless it satisfies the following minimum conditions:

(i) If it is insulated equipment, in which case the reference equipment may be insulated, refrigerated, mechanically refrigerated, heated or mechanically refrigerated and heated equipment,

the construction shall be comparable and, in particular, the insulating material and the method of insulation shall be identical;

the thickness of the insulating material shall be not less than that of the reference equipment;

the interior fittings shall be identical or simplified;

the number of doors and the number of hatches or other openings shall be the same or less; and

the inside surface area of the body shall not be as much as 20% greater or smaller;

minor and limited modifications of added or exchanged interior and exterior fittings may be permitted:[4]

- if the equivalent volume of accumulated insulation material of all such modifications is less than 1/100th of the total volume of the insulating material in the insulated unit;

- if the *K* coefficient of the tested reference equipment, corrected by a calculation of the added thermal losses, is less than or equal to the *K* coefficient limit of the category of the equipment; and

- if such modifications of interior fittings are carried out using the same technique, particularly as concerns glued fittings.

All modifications shall be done by or be approved by the manufacturer of the insulated equipment.

(ii) If it is refrigerated equipment, in which case the reference equipment shall be refrigerated equipment,

the conditions set out under (i) above shall be satisfied;

inside circulating fans shall be comparable;

the source of cold shall be identical; and

the reserve of cold per unit of inside surface area shall be greater or equal;

(iii) If it is mechanically refrigerated equipment, in which case the reference equipment shall be either:

a) mechanically refrigerated equipment;

- the conditions set out in (i) above shall be satisfied; and

- the effective refrigerating capacity of the mechanical refrigeration appliance per unit of inside surface area, under the same temperature conditions, shall be greater or equal; or

b) insulated equipment which is complete in every detail but minus its mechanical refrigeration unit which will be fitted at a later date.

The resulting aperture will be filled, during the measurement of the *K* coefficient, with close fitting panels of the same overall thickness and type of insulation as is fitted to the front wall. In which case:

- the conditions set out in (i) above shall be satisfied; and

- the effective refrigerating capacity of the mechanical refrigeration unit fitted to insulated reference equipment shall be as defined in annex 1, appendix 2, paragraph 3.2.6.

(iv) If it is heated equipment, in which case the reference equipment may be insulated or heated equipment,

– the conditions set out under (i) above shall be satisfied;

– the source of heat shall be identical; and

– the capacity of the heating appliance per unit of inside surface area shall be greater or equal.

(v) If it is mechanically refrigerated and heated equipment, in which case the reference equipment shall be:

a) mechanically refrigerated and heated equipment,

- the conditions set out under (i) above shall be satisfied; and

- the effective refrigerating capacity of the mechanical refrigeration or mechanical refrigeration-heating appliance per unit of inside surface area, under the same temperature conditions, shall be greater or equal;

- the source of heat shall be identical; and

- the capacity of the heating appliance per unit of inside surface area shall be greater or equal; or

b) insulated equipment which is complete in every detail but minus its

mechanical refrigeration, heating or mechanical refrigeration-heating appliance, which will be fitted at a later date.

The resulting aperture will be filled, during the measurement of the *K* coefficient, with close fitting panels of the same overall thickness and type of insulation as are fitted to the front wall, in which case:

- the conditions set out under (i) above shall be satisfied; and
- the effective refrigerating capacity of the mechanical refrigeration or mechanical refrigeration-heating unit fitted to insulated reference equipment shall be as defined in annex 1, appendix 2, paragraph 3.4.7;
- the source of heat shall be identical; and
- the capacity of the heating appliance per unit of inside surface area shall be greater or equal.

d) If, in the course of the six-year period, the production series exceeds 100 units, the competent authority shall determine the percentage of units to be tested.

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[3] *These requirements shall apply to new plates only. A transitional period of three months shall be granted from the date of entry into force of this requirement.*

[4] *The present provisions regarding minor and limited modifications apply to equipment manufactured after the date of their entry into force (30 September 2015).*

Annex 1, Appendix 2

METHODS AND PROCEDURES FOR MEASURING AND CHECKING THE INSULATING CAPACITY AND THE EFFICIENCY OF THE COOLING OR HEATING APPLIANCES OF SPECIAL EQUIPMENT FOR THE CARRIAGE OF PERISHABLE FOODSTUFFS

1. DEFINITIONS AND GENERAL PRINCIPLES

1.1 *K* coefficient. The overall heat transfer coefficient (*K* coefficient) of the special equipment is defined by the following formula:

$$K = \frac{W}{S \cdot \Delta T}$$

where *W* is either the heating power or the cooling capacity, as the case may be, required to maintain a constant absolute temperature difference ΔT between the mean inside temperature *Ti* and the mean outside temperature *Te*, during continuous operation, when the mean outside temperature *Te* is constant for a body of mean surface area *S*.

1.2 The mean surface area S of the body is the geometric mean of the inside surface area Si and the outside surface area Se of the body.

$$S = \sqrt{S_i \cdot S_e}$$

In determining the two surface areas Si and Se, structural peculiarities and surface irregularities of the body, such as chamfers, wheel-arches and similar features, shall be taken into account and shall be noted under the appropriate heading in test reports; however, if the body is covered with corrugated sheet metal the area considered shall be that of the plane surface occupied, not that of the developed corrugated surface.

For calculating the mean surface area of the body of a panel van, the test station appointed by the competent authority shall select from one of the following three methods.

Method A. The manufacturer shall provide drawings and calculations of the inside and outside surfaces.

The surface areas Se and Si are determined taking into consideration the projected surface areas of specific design features of the irregularities of its surface such as curves, corrugations, wheel boxes, etc.

Method B. The manufacturer shall provide drawings and the test station appointed by the competent authority shall use the calculations according to the schemes[5] and formulae below.

$$Si = (((WI \times LI) + (HI \times LI) + (HI \times WI)) \times 2)$$
$$Se = (((WE \times LE) + (HE \times LE) + (HE \times WE)) \times 2)$$

Where:

WI is the Y axis of the internal surface area LI is the X axis of the internal surface area
HI is the Z axis of the internal surface area WE is the Y axis of the external surface area LE is the X axis of the external surface area

HE is the Z axis of the external surface area

Using the most appropriate formula for the Y axis of the internal surface area

$$WI = (WIa \times a + WIb \times (b + c/2) + WIc \times c/2) / (a + b + c)$$
$$WI = (WIa \times a/2 + WIb\ (a/2 + b/2) + WIc\ (b/2)) / (a + b)$$
$$WI = (WIa \times a + WIb \times b + (WIb + WIc)/2 \times c) / (a + b + c)$$

Where:

WIa is the internal width at the floor or between the wheel arches
WIb is the internal width at the height of the vertical edge from the floor or above the wheel arches.
WIc is the internal width along the roof
a is the height of the vertical edge from the floor
b is either the height between the bottom of the vertical edge and the roof or between the top of the wheel arch and the top of the vertical edge from the floor.
c is the height between the roof and point b

Along with the two formulae for the X and Z axes of the internal surface:

$$LI = ((LIa \times a) + (LIb + LIc) / 2 \times b + (LIc \times c)) / (a + b + c)$$

Where:
LIa is the internal length along the floor
LIb is the internal length above the wheel arches LIc is the internal length along the roof
a is the height between LIa and LIb b is the height between LIb and LIc
c is the height between LIc and the roof

$$WI = (WI\ back + WI\ front) / 2$$

Where:
WI back is the width at the bulkhead
WI front is the width at the door end

The external surface area is calculated using the formulae below

$$WE = WI + declared\ mean\ thickness \times 2$$
$$LE = LI + declared\ mean\ thickness \times 2$$
$$HE = HI + declared\ mean\ thickness \times 2$$

Method C. If neither of the above is acceptable to the experts, the internal surface shall be measured according to the figures and formulae in method B.

The K value shall then be calculated based on the internal surface area, taking the insulation thickness as nil. From this K value, the average insulation thickness is calculated from the assumption that λ for the insulation has a value of 0.025 W/m°C.

$$d = Si \times \Delta T \times \lambda / W$$

Once the thickness of the insulation has been estimated, the external surface area is calculated and the mean surface area is determined. The final K value is derived from successive iteration.

Temperature measuring points

1.3 In the case of parallelepipedic bodies, the mean inside temperature of the body (Ti) is the arithmetic mean of the temperatures measured 10 cm from the walls at the following 12 points:

a) The eight inside corners of the body; and

b) The centres of the four inside faces having the largest area.

If the body is not parallelepipedic, the 12 points of measurements shall be distributed as satisfactorily as possible having regard to the shape of the body.

1.4 In the case of parallelepipedic bodies, the mean outside temperature of the body (Te) is the arithmetic mean of the temperatures measured 10 cm from the walls at the following 12 points:

a) The eight outside corners of the body; and

b) The centres of the four outside faces having the largest area.

If the body is not parallelepipedic, the 12 points of measurement shall be distributed as satisfactorily as possible having regard to the shape of the body.

1.5 The mean temperature of the walls of the body is the arithmetic mean of the mean outside temperature of the body and the mean inside temperature of the body:

$$\frac{T_e + T_i}{2}$$

1.6 Temperature measuring instruments protected against radiation shall be placed inside and outside the body at the points specified in paragraphs 1.3 and 1.4 of this appendix.

Steady state period and duration of test

1.7 The mean outside temperatures and the mean inside temperatures of the body, taken over a steady period of not less than 12 hours, shall not vary by more than ±0.3 °C, and these temperatures shall not vary by more than ±1.0 °C during the preceding 6 hours.

The difference between the heating power or cooling capacity measured over two periods of not less than 3 hours at the start and at the end of the steady state period, and separated by at least 6 hours, shall be less than 3%.

The mean values of the temperatures and heating or cooling capacity over at least the last 6 hours of the steady state period will be used in *K* coefficient calculation.

The mean inside and outside temperatures at the beginning and the end of the calculation period of at least 6 hours shall not differ by more than 0.2 °C.

2. INSULATING CAPACITY OF EQUIPMENT

Procedures for measuring the *K* coefficient

2.1 Equipment other than liquid foodstuffs tanks

2.1.1 The *K* coefficient shall be measured in continuous operation either by the internal cooling method or by the internal heating method. In either case, the empty body shall be placed in an insulated chamber.

Test method

2.1.2 Where the internal cooling method is used, one or more heat exchangers shall be placed inside the body. The surface area of these exchangers shall be such that, if a fluid at a temperature not lower than 0 °C[6] passes through them, the mean inside temperature of the body remains below + 10 °C when continuous operation has been established. Where the internal heating method is used, electrical heating appliances (resistors, etc.) shall be used. The heat exchangers or electrical heating appliances shall be fitted with fans having a delivery rate sufficient to obtain 40 to 70 air charges per hour related to the empty volume of the tested body, and the air distribution around all inside surfaces of the tested body shall be sufficient to ensure that the maximum difference between the temperatures of any 2 of the 12 points specified in paragraph 1.3 of this appendix does not exceed 2 °C when continuous operation has been established.

2.1.3 Heat quantity: The heat dissipated by the electrical resistance fan heaters shall not exceed a low of 1W/cm^2 and the heater units shall be protected by a casing of low emissivity.

The electrical energy consumption shall be determined with an accuracy of ±0.5%.

Test procedure

2.1.4 Whatever the method employed, the mean temperature of the insulated chamber shall throughout the test be kept uniform, and constant in compliance with paragraph 1.7 of this appendix, at a level such that the temperature difference between the inside of the body and the insulated chamber is 25 °C ± 2 °C, the average temperature of the walls of the body being maintained at +20 °C ± 0.5 °C.

2.1.5 During the test, whether by the internal cooling method or by the internal heating method, the mass of air in the chamber shall be made to circulate continuously so that the speed of movement of the air 10 cm from the walls is maintained at between l and 2 metres/second.

2.1.6 The appliances for generating and distributing cold or heat and for measuring the quantity of cold or heat exchanged and the heat equivalent of the air-circulating fans shall be started up. Electrical cable losses between the heat input measuring instrument and the tested body shall be established by a measurement or calculation and subtracted from the total heat input measured.

2.1.7 When continuous operation has been established, the maximum difference between the temperatures at the warmest and at the coldest points on the outside of the body shall not exceed 2 °C.

2.1.8 The mean outside temperature and the mean inside temperature of the body shall each be read at least every 5 minutes.

2.2 Liquid-foodstuffs tanks

2.2.1 The method described below applies only to single-compartment or multiple-compartment tank equipment intended solely for the carriage of liquid foodstuffs such as milk. Each compartment of such tanks shall have at least one manhole and one discharge-pipe connecting socket; where there are several compartments they shall be separated from one another by non-insulated vertical partitions.

2.2.2 *K* coefficients shall be measured in continuous operation by internal heating of the empty tank in an insulated chamber.

Test method

2.2.3 An electrical heating appliance (resistors, etc.) shall be placed inside the tank. If the tank has several compartments, an electrical heating appliance shall be placed in each compartment. The electrical heating appliances shall be fitted with fans with a delivery rate sufficient to ensure that the difference between the maximum temperature and the minimum temperature inside each compartment does not exceed 3 °C when continuous operation has been established. If the tank comprises several compartments, the difference between the mean temperature in the coldest compartment and the mean temperature in the warmest compartment shall not exceed 2 °C, the temperatures being measured as specified in paragraph 2.2.4 of this appendix.

2.2.4 Temperature measuring instruments protected against radiation shall be placed inside and outside the tank 10 cm from the walls, as follows:

a) If the tank has only one compartment, measurements shall be made at a minimum of 12 points positioned as follows:

- The four extremities of two diameters at right angles to one another, one horizontal and the other vertical, near each of the two ends of the tank;

- The four extremities of two diameters at right angles to one another, inclined at an angle of 45° to the horizontal, in the axial plane of the tank;

b) If the tank has two compartments, the measurements shall be made at least at the following points:

- Near the end of the first compartment and near the partition with the second compartment, at the extremities of three radiuses forming 120° angles, one of the radiuses being directed vertically upwards.

- Near the end of the second compartment and near the partition with the first compartment, at the extremities of three radiuses forming 120° angles, one of the radiuses being directed vertically downwards.

c) If the tank has several compartments, the points of measurement shall be as follows:

for each of the two end compartments, at least the following:

- The extremities of a horizontal diameter near the end and the extremities of a vertical diameter near the partition;

and for each of the other compartments, at least the following:

- The extremities of a diameter inclined at an angle of 45° to the horizontal near one of the partitions and the extremities of a diameter perpendicular to the first and near the other partition.

d) The mean inside temperature and the mean outside temperature of the tank shall respectively be the arithmetic mean of all the measurements taken inside and all the measurements taken outside the tank. In the case of tanks having at least two compartments, the mean inside temperature of each compartment shall be the arithmetic mean of the measurements made in the compartment, and the number of those measurements in each compartment shall be no less than four and the total number of measurements in all compartments of the tank shall be no less than twelve.

Test procedure

2.2.5 Throughout the test, the mean temperature of the insulated chamber shall be kept uniform, and constant in compliance with paragraph 1.7 of this appendix, at a level such that the difference in temperature between the inside of the tank and that of the insulated chamber is not less than 25 °C ± 2 °C, with the average temperature of the tank walls being maintained at +20 °C ± 0.5 °C.

2.2.6 The mass of air in the chamber shall be made to circulate continuously so that the speed of movement of the air 10 cm from the walls is maintained at between l and 2 metres/second.

2.2.7 The appliances for heating and circulating the air and for measuring the quantity of heat exchanged and the heat equivalent of the air-circulating fans shall be started up.

2.2.8 When continuous operation has been established, the maximum difference between the temperatures at the warmest and at the coldest points on the outside of the tank shall not exceed 2 °C.

2.2.9 The mean outside temperature and the mean inside temperature of the body shall each be read at least every 5 minutes.

2.3 Provisions common to all types of insulated equipment

2.3.1 Verification of the *K* coefficient

Where the purpose of the tests is not to determine the *K* coefficient but simply to verify that it is below a certain limit, the tests carried out as described in paragraphs 2.1.1 to 2.2.9 of this appendix may be stopped as soon as the measurements made show that the K coefficient meets the requirements.

2.3.2 Accuracy of measurements of the *K* coefficient

Testing stations shall be provided with the equipment and instruments necessary to ensure that the K coefficient is determined with an expanded uncertainty of ± 10% when using the method of internal cooling and ± 5% when using the method of internal heating. In calculating the expanded uncertainty of measurement of the *K* coefficient, the confidence level should be at least 95%.

3. EFFECTIVENESS OF THERMAL APPLIANCES OF EQUIPMENT

Procedures for determining the efficiency of thermal appliances of equipment

3.1 Refrigerated equipment

3.1.1 The empty equipment shall be placed in an insulated chamber whose mean temperature shall be kept uniform, and constant to within ± 0.5 °C, at +30 °C. The mass of air in the chamber shall be made to circulate as described in paragraph 2.1.5 of this appendix.

3.1.2 Temperature measuring instruments protected against radiation shall be placed inside and outside the body at the points specified in paragraphs 1.3 and 1.4 of this appendix.

Test procedure

3.1.3 a) In the case of **equipment other than equipment with fixed eutectic plates, and equipment fitted with liquefied gas systems**, the maximum weight of refrigerant specified by the manufacturer or which can normally be accommodated shall be loaded into the spaces provided when the mean inside temperature of the body has reached the mean outside temperature of the body (+30 °C). Doors, hatches and other openings shall be closed and the inside ventilation appliances (if any) of the equipment shall be started up at maximum capacity. In addition, in the case of new equipment, a heating appliance with a heating capacity equal to 35% of the heat exchanged through the walls in continuous operation shall be started up inside the body when the temperature prescribed for the class to which the equipment is presumed to belong has been reached. No additional refrigerant shall be loaded during the test;

b) In the case of **equipment with fixed eutectic plates**, the test shall comprise a preliminary phase of freezing of the eutectic solution. For this purpose, when the mean inside temperature of the body and the temperature of the plates have reached the mean outside temperature (+30 °C), the plate- cooling appliance shall be put into operation for 18 consecutive hours after closure of the doors and hatches. If the plate-cooling appliance includes a cyclically-operating mechanism, the total duration of operation of the appliance shall be 24 hours. In the case of new equipment, as soon as the cooling appliance is stopped, a heating appliance with a heating capacity equal to 35% of the heat exchanged through the walls in continuous operation shall be started up inside the body when the temperature prescribed for the class to which the equipment is presumed to belong has been reached. The solution shall not be subjected to any re-freezing operation during the test;

c) In the case of **equipment fitted with liquefied gas systems**, the following test procedure shall be used: when the mean inside temperature of the body has reached the mean outside temperature (+30 °C), the receptacles for the liquefied gas shall be filled to the level prescribed by the manufacturer. Then the doors, hatches and other openings shall be closed as in normal operation and the inside ventilation appliances (if any) of the equipment shall be started up at maximum capacity. The thermostat shall be set at a temperature not more than 2 degrees below the limit temperature of the presumed class of the equipment. Cooling of the body then shall be commenced. During the cooling of the body the refrigerant consumed is simultaneously replaced. This replacement shall be effected:

- either for a time corresponding to the interval between the commencement of

cooling and the moment when the temperature prescribed for the class to which the equipment is presumed to belong is reached for the first time; or

- for a duration of three hours counting from the commencement of cooling, whichever is shorter.

Beyond this period, no additional refrigerant shall be loaded during the test.

In the case of new equipment, a heating appliance with a heating capacity equal to 35% of the heat exchanged through the walls in continuous operation shall be started up inside the body when the class temperature has been reached.

Provisions common to all types of refrigerated equipment

3.1.4 The mean outside temperature and the mean inside temperature of the body shall each be read at least every 5 minutes.

3.1.5 The test shall be continued for 12 hours after the mean inside temperature of the body has reached the lower limit prescribed for the class to which the equipment is presumed to belong (A = +7 °C; B = 10 °C; C = 20 °C; D = 0 °C) or, in the case of equipment with fixed eutectic plates, after stoppage of the cooling appliance.

Criterion of satisfaction

3.1.6 The test shall be deemed satisfactory if the mean inside temperature of the body does not exceed the aforesaid lower limit during the aforesaid period of 12 hours.

3.1.7 If a refrigerating appliance of paragraph 3.1.3 (c) with all its accessories has undergone separately, to the satisfaction of the competent authority, the test in section 9 of this appendix to determine its effective refrigerating capacity at the prescribed reference temperatures, the transport equipment may be accepted as refrigerated equipment without undergoing an efficiency test if the effective refrigerating capacity of the appliance in continuous operation exceeds the heat loss through the walls for the class under consideration, multiplied by the factor 1,75.

3.1.8 If the refrigerating appliance is replaced by a unit of a different type, the competent authority may:

a) Require the equipment to undergo the determinations and verifications prescribed in paragraphs 3.1.3 to 3.1.5; or

b) Satisfy itself that the effective refrigerating capacity of the new refrigerating appliance is, at the temperature prescribed for equipment of the class concerned, at least equal to that of the unit replaced; or

c) Satisfy itself that the effective refrigerating capacity of the new refrigerating appliance meets the requirements of paragraph 3.1.7.

3.1.9 A refrigerating unit working with liquefied gas is regarded as being of the same type as the unit tested if:

a) The same refrigerant is used;

b) The evaporator has the same capacity;

c) The regulation system has the same characteristics;

d) The liquefied gas tank has the same design and its capacity is equal or upper to the capacity stated in the test report.

The diameters and the technology of the supply lines are identical.

3.2 Mechanically refrigerated equipment

Test method

3.2.1 The test shall be carried out in the conditions described in paragraphs 3.1.1 and 3.1.2 of this appendix.

Test procedure

3.2.2 When the mean inside temperature of the body reaches the outside temperature (+30 °C), the doors, hatches and other openings shall be closed and the refrigerating appliance and the inside ventilating appliances (if any) shall be started up at maximum capacity. In addition, in the case of new equipment, a heating appliance with a heating capacity equal to 35% of the heat exchanged through the walls in continuous operation shall be started up inside the body when the temperature prescribed for the class to which the equipment is presumed to belong has been reached.

3.2.3 The mean outside temperature and the mean inside temperature of the body shall each be read at least every 5 minutes.

3.2.4 The test shall be continued for 12 hours after the mean inside temperature of the body has reached:

- either the lower limit prescribed for the class to which the equipment is presumed to belong in the case of classes A, B and C (A = 0 °C; B = -10 °C; C = -20 °C); or

- a level not lower than the upper limit prescribed for the class to which the equipment is presumed to belong in the case of classes D, E, and F (D = 0 °C; E = -10 °C; F = -20 °C).

Criterion of satisfaction

3.2.5 The test shall be deemed satisfactory if the refrigerating appliance is able to maintain the prescribed temperature conditions during the said 12-hour periods, with any automatic defrosting of the refrigerating unit not being taken into account.

3.2.6 If the refrigerating appliance with all its accessories has undergone separately, to the satisfaction of the competent authority, a test to determine its effective refrigerating capacity at the prescribed reference temperatures, the transport equipment may be accepted as mechanically refrigerated equipment without undergoing an efficiency test if the effective refrigerating capacity of the appliance in continuous operation exceeds the heat loss through the walls for the class under consideration, multiplied by the factor 1.75.

3.2.7 If the mechanically refrigerating unit is replaced by a unit of a different type, the competent

authority may:

a) require the equipment to undergo the determinations and verifications prescribed in paragraphs 3.2.1 to 3.2.4; or

b) satisfy itself that the effective refrigerating capacity of the new mechanically refrigerating unit is, at the temperature prescribed for equipment of the class concerned, at least equal to that of the unit replaced; or

c) satisfy itself that the effective refrigerating capacity of the new mechanically refrigerating unit meets the requirements of paragraph 3.2.6.

3.3 Heated equipment

Test method

3.3.1 The empty equipment shall be placed in an insulated chamber whose temperature shall be kept uniform and constant at as low a level as possible. The atmosphere of the chamber shall be made to circulate as described in paragraph 2.1.5 of this appendix.

3.3.2 Temperature measuring instruments protected against radiation shall be placed inside and outside the body at the points specified in paragraphs 1.3 and 1.4 of this appendix.

Test procedure

3.3.3 Doors, hatches and other openings shall be closed and the heating equipment and the inside ventilating appliances (if any) shall be started up at maximum capacity.

3.3.4 The mean outside temperature and the mean inside temperature of the body shall each be read at least every 5 minutes.

3.3.5 The test shall be continued for 12 hours after the difference between the mean inside temperature and the mean outside temperature of the body has reached the level corresponding to the conditions prescribed for the class to which the equipment is presumed to belong. In the case of new equipment, the above temperature difference shall be increased by 35 per cent.

Criterion of satisfaction

3.3.6 The test shall be deemed satisfactory if the heating appliance is able to maintain the prescribed temperature difference during the 12 hours aforesaid.

3.4 Mechanically refrigerated and heated equipment

Test method

3.4.1 The test shall be carried out in two stages. The efficiency of the refrigeration unit of the refrigerating or refrigerating-heating appliance is determined in the first stage and that of the heating appliance is determined in the second stage.

3.4.2 In the first stage, the test shall be carried out in the conditions described in paragraphs 3.1.1

and 3.1.2 of this appendix; in the second stage, it shall be carried out in the conditions described in paragraphs 3.3.1 and 3.3.2 of this appendix.

Test procedure

3.4.3 (a) The general procedure for measuring the effective refrigerating capacity of mechanically refrigerated appliances stipulated in paragraph 4.1 and 4.2 shall be applied after adapting it such that it can be used to measure heating appliances using a calorimeter box.

The temperature at the air inlet of the thermal appliance or at the air inlet of the evaporator inside the calorimeter box shall be +12 °C.

For the measurement of the effective heating capacities of classes A, E and I, one test at a mean outside temperature (*Te*) of -10 °C shall be carried out.

For the measurement of the effective heating capacities of classes B, F and J, tests at two mean outside temperatures (*Te*) shall be carried out: one at -10 °C and the other at -20 °C.

For the measurement of the effective heating capacities of classes C, D, G, H, K, or L, three tests shall be carried out. One test at a mean outside temperature (*Te*) of -10 °C, another test at the minimum outside temperature required by the class and one test at an intermediate outside temperature to allow an interpolation for the effective heating capacities for other in-between class temperatures.

For purely electric heating systems a minimum of one test shall be carried out to measure the effective heating capacities of classes A, B, C, D, E, F, G, H, I, J, K or L. This test should be carried out at +12 °C at the air inlet of the evaporator and the minimum outside temperature required by the class.

(i) If the measurement of the effective heating capacity is carried out at the lowest outside temperature required by the class, no further test shall be required.

(ii) If the measurement of the effective heating capacity is not carried out at the lowest temperature required by the class, an additional functional test of the heating appliance shall be carried out. This functional test shall be done at the minimum temperature required by the class (e.g. -40 °C for class L) to verify that the heating appliance and its drive system (e.g. diesel engine driven generator) starts and works properly at the lowest temperature.

(b) When the measurement is carried out on equipment, the basic requirements for the test procedure for the first stage are described in paragraphs 3.2.2 and 3.2.3 of this appendix; those for the second stage are described in paragraphs 3.3.3 and 3.3.4 of this appendix.

3.4.4 The second stage of the test may be initiated immediately after the end of the first stage, without the measuring equipment being dismantled.

3.4.5 In each stage, the test shall be continued for 12 hours after:

a) in the first stage, the mean inside temperature of the body has reached the lower limit prescribed for the class to which the equipment is presumed to belong;

b) in the second stage, the difference between the mean inside temperature of the body and the mean outside temperature of the body has reached the level corresponding to

the conditions prescribed for the class to which the equipment is presumed to belong. In the case of new equipment, the above temperature difference shall be increased by 35 per cent.

Criterion of satisfaction

3.4.6 The results of the test shall be deemed satisfactory if:

a) in the first stage, the refrigerating or refrigerating-heating appliance is able to maintain the prescribed temperature conditions during the said 12-hour period, with any automatic defrosting of the refrigerating or refrigerating-heating unit not being taken into account;

b) in the second stage, the heating appliance is able to maintain the prescribed temperature difference during the said 12-hour period.

3.4.7 If the refrigerating unit of the refrigerating or refrigerating-heating appliance with all its accessories has undergone separately, to the satisfaction of the competent authority, a test to determine its effective refrigerating capacity at the prescribed reference temperatures, the transport equipment may be accepted as having passed the first stage of the test without undergoing an efficiency test if the effective refrigerating capacity of the appliance in continuous operation exceeds the heat loss through the walls for the class under consideration, multiplied by the factor 1.75.

3.4.8 If the mechanically refrigerating unit of the refrigerating or refrigerating-heating appliance is replaced by a unit of a different type, the competent authority may:

a) require the equipment to undergo the determinations and verifications for the first stage of testing prescribed in paragraphs 3.4.1–3.4.5 of this appendix; or

b) satisfy itself that the effective refrigerating capacity of the new mechanically refrigerating unit is, at the temperature prescribed for equipment of the class concerned, at least equal to that of the unit replaced; or

c) satisfy itself that the effective refrigerating capacity of the new mechanically refrigerating unit meets the requirements of paragraph 3.4.7 of this appendix.

4. PROCEDURE FOR MEASURING THE EFFECTIVE REFRIGERATING CAPACITY Wo OF A UNIT WHEN THE EVAPORATOR IS FREE FROM FROST

4.1 General principles

4.1.1 When attached to either a calorimeter box or the insulated body of a unit of transport equipment, and operating continuously, this capacity is:

$$W_o = W_j + U \cdot \Delta T$$

where *U* is the heat leakage of the calorimeter box or insulated body, Watts/°C.

ΔT is the difference between the mean inside temperature *Ti* and the mean outside temperature *Te* of the calorimeter or insulated body (°C),

Wj is the heat dissipated by the fan heater unit to maintain each temperature difference in equilibrium.

4.2 Test method

4.2.1 The refrigeration unit is either fitted to a calorimeter box or the insulated body of a unit of transport equipment.

In each case, the heat leakage is measured at a single mean wall temperature prior to the capacity test. An arithmetical correction factor, based upon the experience of the testing station, is made to take into account the average temperature of the walls at each thermal equilibrium during the determination of the effective refrigerating capacity.

It is preferable to use a calibrated calorimeter box to obtain maximum accuracy.

Measurements and procedure shall be as described in paragraphs 1.1 to 2.1.8 above; however, it is sufficient to measure U the heat leakage only, the value of this coefficient being defined by the following relationship:

$$U = \frac{W}{\Delta T_m}$$

where:

W is the heating power (in Watts) dissipated by the internal heater and fans;

Δ*Tm* is the difference between the mean internal temperature *Ti* and the mean external temperature *Te*;

U is the heat low per degree of difference between the air temperature inside and outside the calorimeter box or unit of transport equipment measured with the refrigeration unit fitted.

The calorimeter box or unit of transport equipment is placed in a test chamber. If a calorimeter box is used, *U*·Δ*T* should be not more than 35% of the effective refrigerating capacity *Wo*.

The calorimeter box or unit of transport equipment shall be at least normally insulated.

4.2.2 Instrumentation

Test stations shall be equipped with instruments to measure the U value to an accuracy of ± 5%. Heat transfer through air leakage should not exceed 5% of the total heat transfer through the calorimeter box or through the insulated body of the unit of transport equipment. The refrigerating capacity shall be determined with an accuracy of ±5%.

The instrumentation of the calorimeter box or unit of transport equipment shall conform to paragraphs 1.3 and 1.4 above. The following are to be measured:

a) *Air temperatures*: At least four thermometers uniformly distributed at the inlet to the evaporator;

At least four thermometers uniformly distributed at the outlet to the evaporator;

At least four thermometers uniformly distributed at the air inlet(s) to the refrigeration unit;

The thermometers shall be protected against radiation.

The accuracy of the temperature measuring system shall be ±0.2 °C;

b) *Energy consumption*: Instruments shall be provided to measure the electrical energy or fuel consumption of the refrigeration unit.

The electrical energy and fuel consumption shall be determined with an accuracy of ±0.5%;

c) *Speed of rotation*: Instruments shall be provided to measure the speed of rotation of the compressors and circulating fans or to allow these speeds to be calculated where direct measurement is impractical.

The speed of rotation shall be measured to an accuracy of ±1%;

d) *Pressure*: High precision pressure gauges (accurate to ± 1%) shall be fitted to the condenser and evaporator and to the compressor inlet when the evaporator is fitted with a pressure regulator.

4.2.3 Test conditions

a) The average air temperature at the inlet(s) to the refrigeration unit shall be maintained at 30 °C ± 0.5 °C.
The maximum difference between the temperatures at the warmest and at the coldest points shall not exceed 2 °C.

b) Inside the calorimeter box or the insulated body of the unit of transport equipment (at the air inlet to the evaporator): there shall be three levels of temperature between 25 °C and +12 °C depending on the characteristics of the unit, one temperature level being at the minimum prescribed for the class requested by the manufacturer with a tolerance of ±1 °C.

The mean inside temperature shall be maintained within a tolerance of ±0.5 °C. During the measurement of refrigerating capacity, the heat dissipated within the calorimeter box or the insulated body of the unit of transport equipment shall be maintained at a constant level with a tolerance of ± 1%.

When presenting a refrigeration unit for test, the manufacturer shall supply:

- Documents describing the unit to be tested;
- A technical document outlining the parameters that are most important to the functioning of the unit and specifying their allowable range;
- The characteristics of the equipment series tested; and
- A statement as to which prime mover(s) shall be used during testing.

4.3 Test procedure

4.3.1 The test shall be divided into two major parts, the cooling phase and the measurement of the effective refrigerating capacity at three increasing temperature levels.

a) Cooling phase; the initial temperature of the calorimeter box or transport equipment shall be 30 °C ± 3 °C. It shall then be lowered to the following temperatures: -25 °C for -20 °C class, -13 °C for -10 °C class or -2 °C for 0 °C class;

b) Measurement of effective refrigerating capacity, at each internal temperature level.

A first test to be carried out, for at least four hours at each level of temperature, under control of the thermostat (of the refrigeration unit) to stabilize the heat transfer between the interior and exterior of the calorimeter box or unit of transport equipment.

A second test shall be carried out without the thermostat in operation in order to determine the maximum refrigerating capacity, with the heating power of the internal heater producing an equilibrium condition at each temperature level as prescribed in paragraph 4.2.3.

The duration of the second test shall be not less than four hours.

Before changing from one temperature level to another, the box or unit shall be manually defrosted.

If the refrigeration unit can be operated by more than one form of energy, the tests shall be repeated accordingly.

If the compressor is driven by the vehicle engine, the test shall be carried out at both the minimum speed and at the nominal speed of rotation of the compressor as specified by the manufacturer.

If the compressor is driven by the vehicle motion, the test shall be carried out at the nominal speed of rotation of the compressor as specified by the manufacturer.

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 low (m) of the refrigerant liquid by the difference in enthalpy between the refrigerant vapour leaving the unit (h_o) and the liquid at the inlet to the unit (h_i).

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 low measurement being accurate to ±3%.

The heat balance is given by the formula:

$$W_o = (h_o - h_i)m - W_f.$$

An electric heater is placed inside the equipment in order to obtain the thermal equilibrium.

4.3.3 Precautions

As the tests for effective refrigerating capacity are carried out with the thermostat of the refrigeration unit disconnected, the following precautions shall be observed:

If the equipment has a hot gas injection system, it shall be inoperative during the test;

with automatic controls of the refrigeration unit which unload individual cylinders (to tune the capacity of the refrigeration unit to motor output) the test shall be carried out with the number of cylinders appropriate for the temperature.

4.3.4 Checks

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

a) the defrosting system and the thermostat are functioning correctly;

b) 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. ISO 5801: 2017 and AMCA 210-16 is recommended;

c) the refrigerant used for tests is that specified by the manufacturer.

4.4 Test result

4.4.1 The refrigeration capacity for ATP purposes is that relating to the mean temperature at the inlet(s) of the evaporator. The temperature measuring instruments shall be protected against radiation.

4.5 Procedure for testing mechanically refrigeration units if there is a change of refrigerants

4.5.1 General principles

The test is in line with the procedure described in section 4, paragraphs 4.1 to 4.4 and based on a complete test of the refrigeration unit with one refrigerant, the reference refrigerant.

The refrigeration unit, its refrigeration circuit and the components of the refrigeration circuit shall not be different when using replacement refrigerants. Only very limited modifications are permitted that are:

a) Modification and change of expansion device (type, setting);

b) Exchange of the lubricant;

c) Exchange of gaskets.

Making it a retrofit refrigerant, a replacement refrigerant must have thermo-physical and chemical properties similar to the reference refrigerant and shall result in a similar behavior in the refrigeration circuit especially in terms of refrigerating capacities.

4.5.2 Test procedure

Due to the similar behavior of the retrofit and the reference refrigerants the number of tests necessary for a type approval can be reduced. In terms of refrigerating capacity the retrofit refrigerants must comply with a criterion of equivalence which allows an at maximum 10% lower refrigerating capacity for the retrofit refrigerant when compared with the approved reference refrigerant.

The criterion of equivalence is defined by the formula:

$$\frac{Q_{retrof} - Q_{ref}}{Q_{ref}} \geq -0{,}1 \quad (1)$$

where:

Qref is the refrigerating capacity of the unit tested with the reference refrigerant,

Qretrof is the refrigerating capacity of the unit tested with the retrofit refrigerant.

The number of tests and the evaluation of the retrofit refrigerants is based on the differences in test results when compared with the reference refrigerant. At least a test at the lowest and at the highest temperature of the respective temperature class in the mode of drive with the highest refrigerating capacities has to be carried out.

In the case of a range of refrigeration units the test program may be further reduced according to paragraph 4.5.3.

Dependent on the results of these tests further measurements may be necessary. Distinctions are made

for the following cases:

(i) **Strict equivalence:** is the case when the difference between the refrigerating capacities of the retrofit refrigerant is lower than or equal to 10% less at all tested temperatures of the respective temperature class when compared to the reference refrigerant. In the case of higher or up to 5% lower refrigerating capacities, the refrigerating capacities of the reference refrigerant can be kept in the test report of the retrofit refrigerant. In the case of more than 5% lower refrigerating capacities, the refrigerating capacities of the retrofit refrigerant may be calculated based on the test results.

(ii) **Restricted equivalence:** is the case when at least at one tested temperature of the respective temperature class the difference between the refrigerating capacities of the retrofit refrigerant is less than or equal to 10% lower when compared to the reference refrigerant. In this case a further measurement at an intermediate

temperature as specified by the manufacturer is necessary in order to confirm the tendency of the deviation and to calculate the refrigerating capacities of the retrofit refrigerant based on the test results.

If the power consumption tested with the retrofit refrigerant deviates from the results obtained with the reference refrigerant, the data of power consumption shall be adjusted according to the measured values by means of calculation, as well in case of strict as in case of restricted equivalence.

4.5.3 Test procedure for a range of refrigeration units

A range of refrigeration units describes a model range of a specific type of refrigeration units of different sizes and different refrigerating capacities but with the same setup of refrigeration circuit and same type of components of the refrigeration circuit.

In case of a range of refrigeration units a further reduction of tests is possible.

If at least two refrigeration units of the range including the units with the smallest and the highest refrigerating capacities tested with the retrofit refrigerant have been proven by the test procedure described in 4.5.2 to be equivalent to the results of the approved reference refrigerant, test reports for all other units of this range of refrigeration units may be established by calculating the refrigerating capacities based on the test reports of the refrigerating units operating with the reference refrigerant and based on this limited number of tests with the retrofit refrigerant.

The conformity of the tested refrigeration units and each other regarded refrigeration unit with the range of refrigeration units has to be confirmed by the manufacturer. In addition, the competent authority shall take adequate measures to verify that each regarded unit is in conformity to this range of refrigeration units.

4.5.4 Test report

An addendum containing both, the test results of the retrofit refrigerant and the approved reference refrigerant, shall be added to the test report of the refrigeration unit operated by a retrofit refrigerant. All modifications of the refrigerating unit according to 4.5.1 have to be documented in this addendum.

In case the refrigerating capacities and maybe also the power consumption of the refrigeration unit containing the retrofit refrigerant have been established by calculation, the procedure of calculation has to be described in this addendum too.

5. CHECKING THE INSULATING CAPACITY OF EQUIPMENT IN SERVICE

For the purpose of checking the insulating capacity of each piece of equipment in service as prescribed in appendix 1, paragraphs 1 (b) and 1 (c), to this annex, the competent authorities may:

Apply the methods described in paragraphs 2.1.1 to 2.3.2 of this appendix; or

Appoint experts to assess the fitness of the equipment for retention in one or other of the categories of insulated equipment. These experts shall take the following particulars into account and shall base their conclusions on information as indicated below.

5.1 General examination of the equipment

This examination shall take the form of an inspection of the equipment to determine the following:

a) the durable manufacturer's plate affixed by the manufacturer;

b) the general design of the insulating sheathing;

c) the method of application of insulation;

d) the nature and condition of the walls;

e) the condition of the insulated compartment;

f) the thickness of the walls;

and to make all appropriate observations concerning the effective insulating capacity of the equipment. For this purpose the experts may cause parts of the equipment to be dismantled and require all documents they may need to consult (plans, test reports, specifications, invoices, etc.) to be placed at their disposal.

5.2 Examination for air-tightness (not applicable to tank equipment)

The inspection shall be made by an observer stationed inside the equipment, which shall be placed in a brightly-illuminated area. Any method yielding more accurate results may be used.

5.3 Decisions

a) If the conclusions regarding the general condition of the body are favourable, the equipment may be kept in service as insulated equipment of its initial class for a further period of not more than three years. If the conclusions of the expert or experts are not acceptable, the equipment may be kept in service only following a satisfactory measurement of the *K* coefficient according to the procedure described in paragraphs 2.1.1 to 2.3.2 of this appendix; it may then be kept in service for a further period of six years.

b) In the case of heavily insulated equipment, if the conclusions of an expert or experts show the body to be unsuitable for keeping in service in its initial class but suitable for continuing in service as normally insulated equipment, then the body may be kept in service in an appropriate class for a further three years. In this case, the distinguishing marks (as in appendix 4 of this annex) shall be changed appropriately.

c) If the equipment consists of units of serially-produced equipment of a particular type satisfying the requirements of appendix l, paragraph 6, to this annex and belonging to one owner, then in addition to an inspection of each unit of equipment, the *K* coefficient of not less than 1% of the number of units involved, may be measured in conformity with the provisions of sections 2.1, 2.2 and 2.3 of this appendix. If the results of the examinations and measurements are acceptable, all the equipment in question may be kept in service as insulating equipment of its initial class for a further period of six years.

6. VERIFYING THE EFFECTIVENESS OF THERMAL APPLIANCES OF EQUIPMENT IN SERVICE

To verify as prescribed in appendix 1, paragraphs 1 (b) and (c), to this annex the effectiveness of the thermal appliance of each item of refrigerated, mechanically refrigerated, heated or mechanically refrigerated and heated equipment in service, the competent authorities may:

- Apply the methods described in sections 3.1, 3.2, 3.3 and 3.4 of this appendix; or

- Appoint experts to apply the particulars described in sections 5.1 and 5.2 of this appendix, when applicable, as well as the following provisions.

6.1 Refrigerated equipment other than equipment with fixed eutectic accumulators

It shall be verified that the inside temperature of the empty equipment, previously brought to the outside temperature, can be brought to the limit temperature of the class to which the equipment belongs, as prescribed in this annex, and maintained below the said limit temperature for a period t

such that $t \geq \frac{12 \cdot \Delta T}{\Delta T'}$ In which

ΔT is the difference between +30 °C and the said limit temperature, and

$\Delta T'$ is the difference between the mean outside temperature during the test and the class limit temperature, the outside temperature being not lower than +15 °C.

If the results are acceptable, the equipment may be kept in service as refrigerated equipment of its initial class for a further period of not more than three years.

6.2 Mechanically refrigerated equipment

6.2.1 Independent equipment

(i) Equipment constructed from 2 January 2012

It shall be verified that, when the outside temperature is not lower than +15 °C, the inside temperature of the empty equipment can be brought to the class temperature within a maximum period (in minutes), as prescribed in the table below:

Outside temperature	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	˚C
Class C,F	360	350	340	330	320	310	300	290	280	270	260	250	240	230	220	210	min
Class B,E	270	262	253	245	236	228	219	211	202	194	185	177	168	160	151	143	min
Class A,D	180	173	166	159	152	145	138	131	124	117	110	103	96	89	82	75	min

The inside temperature of the empty equipment must have been previously brought to the outside temperature.

If the results are acceptable, the equipment may be kept in service as mechanically refrigerated equipment of its initial class for a further period of not more than three years.

(ii) Transitional provisions applicable to equipment in service

For equipment constructed prior to the date given in 6.2 (i), the following provisions shall apply:

It shall be verified that, when the outside temperature is not lower than +15 °C, the inside temperature of the empty equipment, which has been previously brought to the outside temperature, can be brought within a maximum period of six hours:

- In the case of equipment in classes A, B or C, to the minimum temperature, as prescribed in this annex;

- In the case of equipment in classes D, E or F, to the limit temperature, as prescribed in this annex.

If the results are acceptable, the equipment may be kept in service as mechanically refrigerated equipment of its initial class for a further period of not more than three years.

(iii) Multi-compartment equipment

The test prescribed in (i) shall be conducted simultaneously for all compartments. During the tests, if the dividing walls are movable, they shall be positioned such that the volumes of the compartments correspond with the maximum refrigeration demand.

Measurements shall be taken until the warmest temperature measured by one of the two sensors located inside each compartment matches the class temperature.

For multi-compartment equipment whose compartment temperatures may be modified, a supplementary reversibility test shall then be conducted:

The temperatures of the compartments shall be selected in such a way that adjacent compartments are, to the extent possible, at different temperatures during the test. Certain compartments shall be brought to the class temperature (-20 °C) while others shall be at 0 °C. Once such temperatures are reached, the temperature settings shall be reversed for each compartment, thus bringing the compartments that were at 0 °C to -20 °C and those that were at -20 °C to 0 °C.

It is verified that compartments at 0 °C have a correct temperature regulation at 0 °C ± 3 °C for at least 10 minutes when the other compartments are at -20 °C. Subsequently, the settings for each of the compartments shall be reversed and the same verifications shall be conducted.

In the case of equipment fitted with a heating function, the tests shall begin after the efficiency test when the temperature is -20 °C. Without opening doors, the compartments whose settings had been set at 0 °C shall be warmed, while the other compartments are kept at a temperature of -20 °C. When the control criterion is met, the compartments' settings shall be reversed. There shall be no time limit to carry out these tests.

In the case of equipment without a heating function, it shall be permitted to open the

doors of the compartments to expedite the temperature rise of the compartments in question.

The equipment shall be considered compliant if:

a) For each compartment, the class temperature has been reached within the time limit shown in the table in (i). To define this time limit, the lowest (coldest) mean outside temperature shall be selected from the two sets of measurements taken with the two outside sensors; and

b) The additional tests mentioned in (iii), when required, are satisfactory.

6.2.2 Non-independent equipment

(i) Non-independent equipment, the refrigeration unit of which is powered by the engine of the vehicle

It shall be verified that, when the outside temperature is not lower than 15° C, the inside temperature of the empty equipment can be maintained at the class temperature, after cool-down and stabilization, when the engine is running at the idle speed set by the manufacturer (where applicable), for a minimum period of one hour and thirty minutes.

If the results are satisfactory, the equipment may be kept in service as mechanically refrigerated equipment in its initial class for a further period of not more than three years.

(ii) Transitional provisions for non-independent equipment in service:

For equipment constructed prior to 6 January 2018, this provision need not be applied. In this case the equipment shall comply with the requirements of (i) or (ii) of this paragraph as applicable for the date of construction.

6.2.3 At the request of the manufacturer, replacement of the original refrigerant fluid of a mechanically refrigerated equipment in service is allowed for the refrigerants described in the table below on the following conditions:

Original refrigerant	Drop-in refrigerant
R404A	R452A

a) a test report or addendum confirming equivalence to a similar mechanically refrigerated unit with the drop-in refrigerant fluid is available; and

b) an efficiency test according to 6.2.1 has been successfully carried out.

The manufacturer plate shall be modified or replaced to indicate the replacement refrigerating fluid and the required charge.

The original test report number shall be retained on the ATP certificate of compliance supplemented by a reference to the test report or addendum on which the replacement is based.

6.3 Heated equipment

It shall be verified that the difference between the inside temperature of the equipment and

the outside temperature which governs the class to which the equipment belongs as prescribed in this annex (a difference of 22 °C in the case of class A, 32 °C in the case of class B, 42 °C in the case of class C and 52 °C in the case of class D) can be achieved and be maintained for not less than 12 hours. If the results are acceptable, the equipment may be kept in service as heated equipment of its initial class for a further period of not more than three years.

6.4 Mechanically refrigerated and heated equipment

The check is carried out in two stages.

(i) During the first stage, it shall be verified that, when the outside temperature is not lower than + 15 °C, the inside temperature of the empty equipment can be brought to the class temperature within a maximum period (in minutes), as prescribed in the table in paragraph 6.2 of this appendix.

The inside temperature of the empty equipment shall have been previously brought to the outside temperature.

(ii) In the second stage, it shall be verified that the difference between the inside temperature of the equipment and the outside temperature which governs the class to which the equipment belongs as prescribed in this annex (a difference of 22 °C in the case of classes A, E and I, of 32 °C in the case of classes B, F and J, of 42 °C in the case of classes C, G and K, and of 52 °C in the case of classes D, H, and L), can be achieved and maintained for not less than 12 hours.

If the results are acceptable, the equipment may be kept in service as mechanically refrigerated and heated equipment of its initial class for a further period of not more than three years.

6.5 Temperature measuring points

Temperature measuring points protected against radiation shall be placed inside the body and outside the body.

For measuring the inside temperature of the body (Ti), at least 2 temperature measuring points shall be placed inside the body at a maximum distance of 50 cm from the front wall, 50 cm from the rear door at a height of a minimum of 15 cm and a maximum of 20 cm above the floor area.

For measuring the outside temperature of the body (Te), at least 2 temperature measuring points shall be placed:

(i) One measuring point vertically within 20 cm around the middle height of the body, at a distance of 10 to 20 cm from the side wall, and

(ii) Another measuring point 20 to 50 cm from the air inlet of the condenser unit.

The final reading shall be from the warmest measuring point inside the body at the end of the cool down test. The outside temperature used to determine the maximum cool down time, in case of equipment manufactured from 2 January 2012, is the average temperature of all readings from the outside measuring points until the class temperature has been reached.

6.6 Provisions common to refrigerated, mechanically refrigerated and heated equipment

(i) If the results are not acceptable, refrigerated, mechanically refrigerated, heated, or mechanically refrigerated and heated equipment may be kept in service in its initial class only if it passes at a testing station the tests described in sections 3.1, 3.2, 3.3 and 3.4 of this appendix; it may then be kept in service in its initial class for a further period of six years.

(ii) If the equipment consists of units of serially-produced refrigerated, mechanically refrigerated, heated, or mechanically refrigerated and heated equipment of a particular type satisfying the requirements of appendix I, paragraph 6, to this annex and belonging to one owner, then in addition to an inspection of the thermal appliances to ensure that their general condition appears to be satisfactory, the effectiveness of the cooling or heating appliances of not less than 1% of the number of units may be determined at a testing station in conformity with the provisions of sections 3.1, 3.2, 3.3 and 3.4 of this appendix. If the results of the examinations and of the determination of effectiveness are acceptable, all the equipment in question may be kept in service in its initial class for a further period of six years.

7. PROCEDURE FOR MEASURING THE CAPACITY OF MECHANICAL MULTI-TEMPERATURE REFRIGERATION UNITS AND DIMENSIONING MULTI-COMPARTMENT EQUIPMENT

7.1 Definitions

a) Multi-compartment equipment: Equipment with two or more insulated compartments for maintaining a different temperature in each compartment;

b) Multi-temperature mechanical refrigeration unit: Mechanical refrigeration unit with compressor and common suction inlet, condenser and two or more evaporators set at different temperatures in the various compartments of multi-compartment equipment;

c) Host unit: Refrigeration unit with or without an integral evaporator;

d) Unconditioned compartment: a compartment considered to have no evaporator or for which the evaporator is inactive for the purposes of dimensioning calculations and certification;

e) Multi-temperature operation: Operation of a multi-temperature mechanical refrigeration unit with two or more evaporators operating at different temperatures in multi-compartment equipment;

f) Nominal refrigerating capacity: Maximum refrigerating capacity of the refrigeration unit in mono- temperature operation with two or three evaporators operating simultaneously at the same temperature;

g) Individual refrigerating capacity (*Pind-evap*): The maximum refrigerating capacity of each evaporator in solo operation with the host unit;

h) Effective refrigerating capacity (*Pef-frozen-evap*): The refrigerating capacity available to the lowest temperature evaporator when two or more evaporators are each

operating in multi-temperature mode, as prescribed in paragraph 7.3.5.

7.2 Test procedure for multi-temperature mechanical refrigeration units

7.2.1 General procedure

The test procedure shall be as defined in section 4 of this appendix.

The host unit shall be tested in combination with different evaporators. Each evaporator shall be tested on a separate calorimeter, if applicable.

The nominal refrigerating capacity of the host unit in mono-temperature operation, as prescribed in paragraph 7.2.2, shall be measured with a single combination of two or three evaporators including the smallest and largest.

The individual refrigerating capacity shall be measured for all evaporators, each in mono-temperature operation with the host unit, as prescribed in paragraph 7.2.3.

This test shall be conducted with two or three evaporators including the smallest, the largest and, if necessary, a mid-sized evaporator.

If the multi-temperature unit can be operated with more than two evaporators:

- The host unit shall be tested with a combination of three evaporators: the smallest, the largest and a mid-sized evaporator.

- In addition, on demand of the manufacturer, the host unit can be tested optionally with a combination of two evaporators: the largest and smallest.

The tests are done in independent mode and stand by.

7.2.2 Determination of the nominal refrigerating capacity of the host unit

The nominal refrigerating capacity of the host unit in mono-temperature operation shall be measured with a single combination of two or three evaporators operating simultaneously at the same temperature. This test shall be conducted at -20 °C and at 0 °C.

The air inlet temperature of the host unit shall be +30 °C.

The nominal refrigerating capacity at -10 °C shall be calculated by linear interpolation from the capacities at -20 °C and 0 °C.

7.2.3 Determination of the individual refrigerating capacity of each evaporator

The individual refrigerating capacity of each evaporator shall be measured in solo operation with the host unit. The test shall be conducted at -20 °C and 0 °C. The air inlet temperature of the refrigeration unit shall be +30 °C.

The individual refrigerating capacity at -10 °C shall be calculated by linear interpolation from the capacities at 0 °C and -20 °C.

7.2.4 Test of the remaining effective refrigerating capacities of a set of evaporators in multi-temperature operation at a reference heat load

The remaining effective refrigerating capacity shall be measured for each tested evaporator at -20 °C with the other evaporator(s) operating under control of a thermostat set at 0 °C with a reference heat load of 20% of the individual refrigerating capacity at -20 °C of the evaporator in question. The air inlet temperature of the host unit shall be +30 °C.

For multi-temperature refrigeration units with more than one compressor such as cascade systems or units with two-stage compression systems, where the refrigerating capacities can be simultaneously maintained in the frozen and chilled compartments, the measurement of the effective refrigerating capacity, shall be done at one additional heat load.

7.3 Dimensioning and certification of refrigerated multi-temperature equipment

7.3.1 General procedure

The refrigerating capacity demand of multi-temperature equipment shall be based on the refrigerating capacity demand of mono-temperature equipment as defined in this appendix.

For multi-compartment equipment, a *K* coefficient less than or equal to 0.40 W/m²°C for the outer body as a whole shall be approved in accordance with subsections 2 to 2.2 of this appendix.

The insulation capacities of the outer body walls shall be calculated using the *K* coefficient of the body approved in accordance with this Agreement. The insulation capacities of the internal dividing walls shall be calculated using the *K* coefficients in the table in paragraph 7.3.7.

For issuance of an ATP certificate:

- The nominal refrigerating capacity of the multi-temperature refrigeration unit shall be at least equal to the heat loss through the outer body walls of the equipment as a whole multiplied by the factor 1.75 as specified in paragraph 3.2.6 of this appendix.

- In each compartment, the calculated remaining effective refrigerating capacity at the lowest temperature of each evaporator in multi-temperature operation shall be greater than or equal to the maximum refrigeration demand of the compartment in the most unfavourable conditions, as prescribed in paragraphs 7.3.5 and 7.3.6, multiplied by the factor 1.75 as specified in paragraph 3.2.6 of this appendix.

7.3.2 Conformity of the entire body

The outer body shall have a *K* value $K \leq 0.40$ W/m^2°C.

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

The equipment shall conform to:

$$Pnominal > 1.75 \cdot Kbody \cdot Sbody \cdot \Delta T$$

Where:

Pnominal is the nominal refrigerating capacity of the multi-temperature refrigeration unit,

Kbody is the *K* value of the outer body,

Sbody is the geometric mean surface area of the full body,

Δ*T* is the difference in temperature between outside and inside the body.

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:

$$Pchilled\ demand = (Schilled\text{-}comp - \Sigma Sbulk) \cdot Kbody \cdot \Delta Text + \Sigma (Sbulk \cdot Kbulk \cdot \Delta Tint)$$

Where:

Kbody is the K value given by an ATP test report for the outer body,

Schilled-comp is the surface of the chilled compartment for the given positions of the bulkheads,

Sbulk are the surfaces of the bulkheads,

Kbulk are the K values of the bulkheads given by the table in paragraph 7.3.7,

Δ*Text* is the difference in temperatures between the chilled compartment and +30 °C outside the body,

Δ*Tint* 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.

7.3.4 Determination of the refrigerating demand of frozen compartments

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

$$Pfrozen\ demand = (Sfrozen\text{-}comp - \Sigma Sbulk) \cdot Kbody \cdot \Delta Text + \Sigma (Sbulk \cdot Kbulk \cdot \Delta Tint)$$

Where:

Kbody is the *K* value given by an ATP test report for the outer body,

Sfrozen-comp is the surface of the frozen compartment for the given positions of the bulkheads,

Sbulk are the surfaces of the bulkheads,

Kbulk are the *K* values of the bulkheads given by the table in paragraph 7.3.7,

Δ*Text* is the difference in temperatures between the frozen compartment and +30 °C outside the body,

Δ*Tint* 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.

7.3.5 Determination of the effective refrigerating capacity of frozen evaporators

The effective refrigerating capacity, in given positions of the bulkheads, is calculated as follows:

$$Peff\text{-}frozen\text{-}evap = Pind\text{-}frozen\text{-}evap \cdot [1 - \Sigma (Peff\text{-}chilled\text{-}evap / Pind\text{-}chilled\text{-}evap)]$$

Where:

Peff-frozen-evap is the effective refrigerating capacity of the frozen evaporator with a given configuration,

Pind-frozen-evap is the individual refrigeration capacity of the frozen evaporator at -20 °C,

Peff-chilled-evap is the effective refrigeration capacity of each chilled evaporator in the given configuration as defined in paragraph 7.3.6,

Pind-chilled-evap is the individual refrigerating capacity at -20 °C for each chilled evaporator.

This calculation method is only approved for multi-temperature mechanical refrigeration units with a single one-stage compressor. For multi-temperature refrigeration units with more than one compressor such as cascade systems or units with two-stage compression systems, where the refrigerating capacities can be simultaneously maintained in the frozen and the chilled compartments, this calculation method shall not be used, because it will lead to an underestimation of the effective refrigerating capacities. For this equipment, the effective refrigerating capacities shall be interpolated between the effective refrigerating capacities measured with two different heat loads given in the tests reports as prescribed in 7.2.4.

7.3.6 Conformity declaration

The equipment is declared in conformity in multi-temperature operation if, for each position of the bulkheads, and each distribution of temperature in the compartments:

$$Peff\text{-}frozen\text{-}evap \geq 1.75 \cdot Pfrozen\ demand$$

$$Peff\text{-}chilled\text{-}evap \geq 1.75 \cdot Pchilled\ demand$$

Where:

Peff-frozen-evap is the effective refrigeration capacity of the considered frozen evaporator at the class temperature of the compartment in the given configuration,

Peff-chilled-evap is the effective refrigeration capacity of the considered chilled evaporator at the class temperature of the compartment in the given configuration,

Pfrozen demand is the refrigerating demand of the considered compartment at the class temperature of the compartment in the given configuration as calculated according to 7.3.4,

Pchilled demand is the refrigerating demand of the considered compartment at the class temperature of the compartment in the given configuration as calculated according to 7.3.3.

It shall be considered that all the positions of the bulkheads have been dimensioned if the wall positions from the smallest to the largest compartment sizes are checked by iterative methods whereby no input step change in surface area is greater than 20%.

A declaration of conformity shall be provided in a supplementary document to the certificate of compliance issued by the competent authority of the country of manufacture. The document shall be based on information given by the manufacturer. The declaration shall conform to the layout given in Model No. 14 of this appendix.

This document shall include at least:

a) A sketch showing the actual compartment configuration and evaporator arrangement;

b) Proof by calculation that the multi-compartment equipment meets the requirements of ATP for the user's intended degree of freedom with regards to compartment temperatures and compartment dimensions.

7.3.7 Internal dividing walls

Thermal losses through internal dividing walls shall be calculated using the *K* coefficients in the following table.

	K coefficient [W/m²°C]		*Minimum foam thickness [mm]*
	Fixed	*Removable*	
Longitudinal – alu floor	2	3	25
Longitudinal – GRP floor	1,5	2	25
Transversal – alu floor	2	3,2	40
Transversal – GRP floor	1,5	2,6	40

K coefficients of movable dividing walls include a safety margin for specific ageing and unavoidable thermal leakages.

For specific designs with additional heat transfer caused by additional thermal bridges compared to a standard design, the partition *K* coefficient shall be increased.

7.3.8 The requirements of section 7 shall not apply to equipment produced before the entry into force of the requirements and having undergone equivalent tests as multi-temperature equipment. Equipment produced before the entry into force of this section may be operated in international transport but may only be transferred from one country to another with the agreement of the competent authorities of the countries concerned.

8. TEST REPORTS

A test report of the type appropriate to the equipment tested shall be drawn up for each test in conformity with one or other of the models 1 to 14 hereunder.

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[5] *The relevant figures can be found in the ATP Handbook at the following link: https://unece.org/atp-handbook*

[6] *To prevent frosting.*

MODEL No. 1 A

Test Report

Prepared in conformity with the provisions of the Agreement on the International Carriage of Perishable Foodstuffs and on the Special Equipment to be Used for such Carriage (ATP)

Test report No.....

Section 1

Specifications of the equipment (equipment other than tanks for the carriage of liquid foodstuffs)

Approved testing station/expert:[1]
- Name .....
- Address .....

Type of equipment:[2]
- Make ..... Registration number ..... Serial number .....
- Date of first entry into service .....
- Tare[3] ..... kg Carrying capacity[3] ..... kg

Body:
- Make and type ..... Identification number .....
- Built by .....
- Owned or operated by .....
- Submitted by .....
- Date of construction (month/year) .....

Principal dimensions:
- Outside: length ..... m, width ..... m, height ..... m
- Inside: length ..... m, width ..... m, height ..... m
- Total floor area of body ..... m^2
- Usable internal volume of body ..... m^3
- Method used[1,3] ..... Figures used[1,3].....
- Total inside surface area Si of body ..... m^2
- Total outside surface area Se of body ..... m^2
- Mean surface area: $S = \sqrt{S_i \cdot S_e}$ ..... m^2

Specifications of the body walls:[4]
- Top .....
- Bottom .....
- Sides .....

Structural peculiarities of body:[5]
- Number, positions and dimensions) of doors .....
-) of vents .....
-) of ice-loading apertures .....

Accessories[6] .....
K coefficient = ... $W/m^2°C$

---

[1] *Delete as necessary (experts only in the case of tests carried out under ATP Annex 1, Appendix 2, sections 5 or 6).*
[2] *Wagon, lorry, trailer, semitrailer, container, etc.*
[3] *State source of information.*
[4] *Nature and thickness of materials constituting the body walls, from the interior to the exterior, mode of construction, etc.*
[5] *If there are surface irregularities, show how Si and Se were determined.*
[6] *Meat bars, flettner fans, etc.*

MODEL No. 1 B

Test Report

Prepared in conformity with the provisions of the Agreement on the International Carriage of Perishable Foodstuffs and on the Special Equipment to be Used for such Carriage (ATP)

Test report No .....

Section 1

Specifications of tanks for the carriage of liquid foodstuffs

---

Approved testing station/expert:[1]

Name .....

Address .....

Type of tank:[2]

Make ..... Registration number ..... Serial number .....

Date of first entry into service .....

Tare[3] ..... kg Carrying capacity[3] ..... kg

Tank:

Make and type ..... Identification number .....

Built by .....

Owned or operated by .....

Submitted by .....

Date of construction (month/year) .....

Principal dimensions:

Outside: length of cylinder ..... m, major axis ..... m, minor axis ..... m

Inside: length of cylinder ..... m, major axis ..... m, minor axis ..... m

Usable internal volume ..... m^3

Internal volume of each compartment ..... m^3

Total inside surface area Si of tank ..... m^2

Inside surface area of each compartment $S_{i1....}$, S_{i2} .... m^2

Total outside surface area Se of tank ..... m^2

Mean surface area of tank: $S = \sqrt{S_i \cdot S_e}$ ..... m^2

Specifications of the tank walls:[4] .....

Structural peculiarities of the tank:[5] .....

Number, dimensions and description of manholes .....

Description of manhole covers .....

Number, dimensions and description of discharge piping .....

Number and description of tank cradles .....

Accessories .....

---

[1] *Delete as necessary (experts only in the case of tests carried out under ATP Annex 1, Appendix 2, sections 5 or 6).*

[2] *Wagon, lorry, trailer, semi-trailer, container, etc.*

[3] *State source of information.*

[4] *Nature and thickness of materials constituting the tank walls, from the interior to the exterior, mode of construction, etc.*

[5] *If there are surface irregularities, show how Si and Se were determined.*

MODEL No. 2 A

Section 2

Measurement in accordance with ATP, Annex 1, Appendix 2, sub-section 2.1, of the overall coefficient of heat transfer of equipment other than tanks for liquid foodstuffs

---

Testing method: inside cooling/inside heating[1]
Date and time of closure of equipment's doors and other openings: .....
Averages obtained for ..... hours of continuous operation (from ..... a.m./p.m. to ..... a.m./p.m.):

(a) Mean outside temperature of body: Te = ... °C ± ..... °C
(b) Mean inside temperature of body: Ti = ... °C ± ..... °C
(c) Mean temperature difference achieved: ΔT = ... °C

Maximum temperature spread:

Outside body ..... °C
Inside body ..... °C

Mean temperature of walls of body $\frac{T_e + T_i}{2}$ ..... °C
Operating temperature of heat exchanger[2] ..... °C
Dew point of atmosphere outside body during continuous operation[2] ..... °C ± ..... °C
Total duration of test ..... h
Duration of continuous operation ..... h
Power consumed in exchangers: W1 ..... W
Portion of power absorbed by the fans entering the body: W2 ..... W
Overall coefficient of heat transfer calculated by the formula:

Inside-cooling test[1] $K = \frac{W_1 - W_2}{S \cdot \Delta T}$

Inside-heating test[1] $K = \frac{W_1 + W_2}{S \cdot \Delta T}$

K = ... W/m²°C

Expanded uncertainty with test used[3] .....%
(coverage factor k = ... for an accepted confidence level .....%)
Remarks:[4] .....

(To be completed only if the equipment does not have thermal appliances:)

According to the above test results, the equipment may be recognized by means of a certificate in accordance with ATP Annex 1, Appendix 3, valid for a period of not more than six years, with the distinguishing mark IN/IR.[1]

However, this report shall be valid as a certificate of type approval within the meaning of ATP Annex 1, Appendix 1, paragraph 6 (a) only for a period of not more than six years, that is until .....

Done at: .....

Date of test report: ....
Testing Officer

[1] *Delete if not applicable.*
[2] *For inside-cooling test only.*
[3] *The present provisions concerning the use of expanded uncertainty instead of the maximum error are applicable to the tests carried out after 1 January 2021*
[4] *If the body is not parallelepipedic, specify the points at which the outside and inside temperatures were measured.*

***MODEL No*. 2 B**

Section 2

Measurement, in accordance with ATP Annex 1, Appendix 2, sub-section 2.2, of the overall coefficient of heat transfer of tanks for liquid foodstuffs

---

Testing method: inside heating
Date and time of closure of equipment's openings .....
Mean values obtained for ..... hours of continuous operation (from ..... a.m./p.m. to ..... a.m./p.m.):

(a) Mean outside temperature of tank: Te = ... °C ± ..... °C

(b) Mean inside temperature of tank:

$$T_i = \frac{\sum S_{in} \cdot T_{in}}{\sum S_{in}}$$ = ... °C ± ..... °C

(c) Mean temperature difference achieved: ΔT ..... °C

Maximum temperature spread:

Inside tank ..... °C
Inside each compartment ..... °C
Outside tank ..... °C

Mean temperature of tank walls ..... °C
Total duration of test .....h
Duration of continuous operation ..... h
Power consumed in exchangers: W1 ..... W
Portion of power absorbed by the fans entering the body: W2 ..... W
Overall coefficient of heat transfer calculated by the formula:

$$K = \frac{W_1 + W_2}{S \cdot \Delta T}$$

K = ... W/m^2°C
Expanded uncertainty with test used[1].....%
(coverage factor k = ... for an accepted confidence level .....%)
Remarks:[2] .....

(To be completed only if the equipment does not have thermal appliances:)

According to the above test results, the equipment may be recognized by means of a certificate in accordance with ATP Annex 1, Appendix 3, valid for a period of not more than six years, with the distinguishing mark IN/IR.[3]

However, this report shall be valid as a certificate of type approval within the meaning of ATP Annex 1, Appendix 1, paragraph 6 (a) only for a period of not more than six years, that is until .....

Done at: .....

Date of test report: ....

Testing Officer

[1] *The present provisions concerning the use of expanded uncertainty instead of the maximum error are applicable to the tests carried out after 1 January 2021*

[2] *If the tank is not parallelepipedic, specify the points at which the outside and inside temperatures were measured.*

[3] *Delete as necessary.*

MODEL No. 3

Section 2

Expert field check of the insulating capacity of equipment in service in accordance with ATP Annex 1, Appendix 2, section 5

The check was based on test report No ..... dated .....
issued by approved testing station/expert (name and address) .....
Condition when checked:
Top .....
Side walls .....
End wall .....
Bottom .....
Doors and openings .....
Seals .....
Cleaning drainholes .....
Air tightness .....
K coefficient of the equipment when new (as shown in the previous test report)
.....
..... $W/m^2°C$
Remarks: .....

According to the above test results the equipment may be recognized by means of a certificate in accordance with ATP Annex 1, Appendix 3, valid for not more than three years, with the distinguishing mark IN/IR.[1]

Done at: .....

Date of test report: ....

Testing Officer

---

[1] *Delete as necessary.*

MODEL No. 4 A

Section 3

Determination of the efficiency of cooling appliances of refrigerated equipment using ice or dry ice by an approved testing station in accordance with ATP Annex 1, Appendix 2, sub-section 3.1, except 3.1.3 (b) and 3.1.3 (c)

Cooling appliance:

- Description of cooling appliance .....
- Nature of refrigerant .....
- Nominal refrigerant filling capacity specified by manufacturer ..... kg
- Actual filling of refrigerant used for test ..... kg
- Drive independent/dependent/mains-operated[1] .....
- Cooling appliance removable/not removable[1] .....
- Manufacturer .....
- Type, serial number .....
- Date of manufacture (month/year) .....
- Filling device (description, where situated; attach drawing if necessary) .....

Inside ventilation appliances:

- Description (number of appliances, etc.) .....
- Power of electric fans ..... W
- Delivery rate ..... m^3/h
- Dimensions of ducts: cross-section ..... m^2, length ..... m
- Air intake screen; description[1] .....

Automatic devices .....

Mean temperatures at beginning of test:

- Inside ..... °C ± .....°C
- Outside ..... °C ± .....°C
- Dew point in test chamber ..... °C ± .....°C

Power of internal heating system ..... W

Date and time of closure of equipment's doors and other openings .....

Record of mean inside and outside temperatures of body and/or curve showing variation of these temperatures with time .....

Remarks: .....

According to the above test results, the equipment may be recognized by means of a certificate in accordance with ATP Annex 1, Appendix 3, valid for a period of not more than six years, with the distinguishing mark

.....

However, this report shall be valid as a certificate of type approval within the meaning of ATP Annex 1, Appendix 1, paragraph 6 (a) only for a period of not more than six years, that is until

.....

Done at: .....

Date of test report: ....

Testing Officer

---

[1] *Delete if not applicable.*

MODEL No. 4 B

Section 3

Determination of the efficiency of cooling appliances of refrigerated equipment with eutectic plates by an approved testing station in accordance with ATP Annex 1, Appendix 2, sub-section 3.1, except 3.1.3 (a) and 3.1.3 (c)

Cooling appliance:
- Description .....
- Nature of eutectic solution .....
- Nominal eutectic solution filling capacity specified by manufacturer ..... kg
- Latent heat at freezing temperature stated by manufacturer ..... kJ/kg at ..... °C
- Cooling appliance removable/not removable[1]
- Drive independent/dependent/mains-operated[1]
- Manufacturer .....
- Type, serial number .....
- Date of manufacture (month/year) .....
- Eutectic plates: Make ..... Type .....
- Dimensions and number of plates, where situated; distance from walls (attach drawing) .....
- Total cold reserve stated by manufacturer for freezing temperature of ..... kJ to .....°C

Inside ventilation appliances (if any):
- Description .....
- Automatic devices .....

Mechanical refrigerator (if any):
- Make ..... Type ..... No. .....
- Where situated .....
- Compressor: Make ..... Type .....
- Type of drive .....
- Nature of refrigerant .....
- Condenser .....
- Refrigerating capacity stated by the manufacturer for the specified freezing temperature and an outside temperature of +30 °C ..... W

Automatic devices:
- Make ..... Type .....
- Defrosting (if any) .....
- Thermostat .....
- LP pressostat .....
- HP pressostat .....
- Relief valve .....
- Others .....

Accessory devices:
- Electrical heating devices of the door joint:
- Capacity by linear metre of the resistor ..... W/m
- Linear length of the resistor ..... m

Mean temperatures at beginning of test:
- Inside ..... °C ± .....°C
- Outside ..... °C ± .....°C
- Dew point in test chamber ..... °C ± .....°C

Power of internal heating system ..... W
Date and time of closure of equipment's doors and openings .....
Period of accumulation of cold ..... h
Record of mean inside and outside temperatures of body and/or curve showing variation of these temperatures with time .....
Remarks: .....

According to the above test results, the equipment may be recognized by means of a certificate in accordance with ATP Annex 1, Appendix 3, valid for a period of not more than six years, with the distinguishing mark
.....

However, this report shall be valid as a certificate of type approval within the meaning of ATP Annex 1, Appendix 1, paragraph 6 (a) only for a period of not more than six years, that is until
.....

Done at: .....

Date of test report: ....

Testing Officer

---

[1] *Delete if not applicable.*

MODEL No. 4 C

Section 3

Determination of the efficiency of cooling appliances of refrigerated equipment using liquefied gases by an approved testing station in accordance with ATP Annex l, Appendix 2, sub-section 3.1, except 3.1.3 (a) and 3.1.3 (b)

Cooling appliance:

Description .....

Drive independent/dependent/mains-operated[1]

Cooling appliance removable/not removable[1]

Manufacturer .....

Type, serial number .....

Date of manufacture (month/year) .....

Nature of refrigerant .....

Nominal refrigerant filling capacity specified by manufacturer ..... kg

Actual filling of refrigerant used for test ..... kg

Description of tank .....

Filling device (description, where situated) .....

Inside ventilation appliances:

Description (number, etc.) .....

Power of electric fans ..... W

Delivery rate ..... m^3/h

Dimensions of ducts: cross-section ..... m^2, length ..... m

Automatic devices .....

Mean temperatures at beginning of test:

Inside ..... °C ± .....°C

Outside ..... °C ± .....°C

Dew point in test chamber ..... °C ± .....°C

Power of internal heating system ..... W

Date and time of closure of equipment's doors and openings .....

Record of mean inside and outside temperatures of body and/or curve showing variation of these temperatures with time .....

Remarks: .....

According to the above test results, the equipment may be recognized by means of a certificate in accordance with ATP Annex 1, Appendix 3, valid for a period of not more than six years, with the distinguishing mark

.....

However, this report shall be valid as a certificate of type approval within the meaning of ATP Annex 1, Appendix 1, paragraph 6 (a), only for a period of not more than six years, that is until .....

Done at: .....

Date of test report: ....

Testing Officer

---

[1] *Delete if not applicable.*

MODEL No. 5

Section 3

Determination of the efficiency of cooling appliances of mechanically refrigerated equipment by an approved testing station in accordance with ATP Annex 1, Appendix 2, sub-section 3.2

Mechanical refrigerating appliances:

Drive independent/dependent/mains-operated[1] .....

Mechanical refrigerating appliances removable/not removable[1] .....

Manufacturer .....

Type, serial number .....

Date of manufacture (month/year) .....

Refrigerant charge:

Refrigerant fluid: (ISO/ASHRAE designation)[a)] .....

Nominal mass of refrigerant .....

Effective refrigerating capacity stated by manufacturer for an outside temperature of + 30 °C and an inside temperature of:

0 °C .....W

-10 °C ..... W

-20 °C .....W

Compressor:

Make ..... Type .....

Drive: electric/thermal/hydraulic/other[1]

Description ..... Make ..... Type .....

power ..... kW at ..... rpm

Condenser and evaporator .....

Motor element of fan(s): make ..... type ..... number .....

power ..... kW at ..... rpm

Inside ventilation appliances:

Description (number of appliances, etc.) .....

Power of electric fans ..... W

Delivery rate ..... m^3/h

Dimensions of ducts: cross-section ..... m^2, length ..... m

Automatic devices:

Make ..... Type .....

Defrosting (if any) .....

Thermostat .....

LP pressostat .....

HP pressostat .....

Relief valve .....

Others .....

Mean temperatures at beginning of test:

Inside temperature ..... °C ± ..... °C

Outside temperature ..... °C ± ..... °C

Dew point in test chamber ..... °C ± ..... °C

Power of internal heating system ..... W

Date and time of closure of equipment's doors and other openings .....

Record of mean inside and outside temperatures of body and/or curve showing variation of these temperatures with time .....

Time between beginning of test and attainment of prescribed mean inside temperature of body ..... h

Remarks: .....

According to the above test results, the equipment may be recognized by means of a certificate in accordance with ATP Annex 1, Appendix 3, valid for a period of not more than six years, with the distinguishing mark
.....

However, this report shall be valid as a certificate of type approval within the meaning of ATP Annex 1, Appendix 1, paragraph 6 (a), only for a period of not more than six years, that is until
.....

Done at: .....

Date of test report: ....

Testing Officer

---

[1] *Delete if not applicable.*
[a)] *If existing*

***MODEL No*. 6**

Section 3

Determination of the efficiency of heating appliances of heated equipment by an approved testing station in accordance with ATP Annex 1, Appendix 2, sub-section 3.3

Heating appliance:

Description .....

Drive independent/dependent/mains-operated[1] .....

Heating appliance removable/not removable[1] .....

Manufacturer .....

Type, serial number .....

Date of manufacture (month/year) .....

Where situated .....

Overall area of heat exchange surfaces ..... m^2

Effective power rating as specified by manufacturer ..... kW

Inside ventilation appliances:

Description (number of appliances, etc.) .....

Power of electric fans ..... W

Delivery rate ..... m^3/h

Dimensions of ducts: cross-section ..... m^2, length ..... m

Mean temperatures at beginning of test:

Inside temperature ..... °C ± ..... °C

Outside temperature ..... °C ± ..... °C

Date and time of closure of equipment's doors and other openings .....

Record of mean inside and outside temperatures of body and/or curve showing variation of these temperatures with time .....

Time between beginning of test and attainment of prescribed mean inside temperature of body .....h

Where applicable, mean heating output during test to maintain prescribed temperature difference[2] between inside and outside of body ..... W

Remarks: .....

According to the above test results, the equipment may be recognized by means of a certificate in accordance with ATP Annex 1, Appendix 3, valid for a period of not more than six years, with the distinguishing mark .....

However, this report shall be valid as a certificate of type approval within the meaning of ATP Annex 1, Appendix 1, paragraph 6 (a), only for a period of not more than six years, that is until .....

Done at: .....

Date of test report: ....

Testing Officer

---

[1] *Delete if not applicable.*

[2] *Increased by 35 % for new equipment.*

MODEL No. 7

Section 3

Determination of the efficiency of cooling and heating appliances of mechanically refrigerated and heated equipment by an approved testing station in accordance with ATP Annex 1, Appendix 2, subsection 3.4

Mechanical refrigerating appliances:

Drive independent/dependent/mains-operated[1]
Mechanical refrigerating appliances removable/not removable[1]
Manufacturer .....
Type, serial number .....
Date of manufacture (month/year) .....

Refrigerant charge:

Refrigerant fluid: (ISO/ASHRAE designation)[a)] .....
Nominal mass of refrigerant .....
Effective refrigerating capacity stated by manufacturer for an outside temperature of + 30 °C and an inside temperature of:
0 °C ..... W
-10 °C ..... W
-20 °C ..... W

Compressor:

Make ..... Type .....
Drive: electric/thermal/hydraulic/other[1]
Description .....
Make ..... Type ..... power
..... kW at ..... rpm
Condenser and evaporator .....
Motor element of fan(s): make ..... type ..... number
.....
power ..... kW at ..... rpm

Heating appliance:

Description .....
Drive independent/dependent/mains-operated[1]
Heating appliance removable/not removable[1]
Manufacturer .....
Type, serial number .....
Date of manufacture (month/year) .....
Where situated .....
Overall area of heat exchange surfaces ..... m^2
Effective power rating as specified by manufacturer .....kW

Inside ventilation appliances:

Description (number of appliances, etc.) .....
Power of electric fans ..... W
Delivery rate .....m^3/h
Dimensions of ducts: cross-section ..... m^2, length ..... m

Automatic devices:

Make ..... Type .....
Defrosting (if any) .....
Thermostat .....
LP pressostat .....

HP pressostat .....
Relief valve .....
Others .....

Mean temperatures at beginning of test:

Inside ..... °C ± ..... °C
Outside ..... °C ± ..... °C
Dew point in test chamber[2] ..... °C ± ..... °C

Power of internal heating system .....
Date and time of closure of equipment's doors and openings .....
Record of mean inside and outside temperatures of body and/or curve showing variation of these temperatures with time .....
Time between beginning of test and attainment of prescribed mean inside temperature of body..... h
Where applicable, mean heating output during test to maintain prescribed temperature difference[3] between inside and outside of body[4] .....W
Remarks: .....

According to the above test results, the equipment may be recognized by means of a certificate in accordance with ATP Annex 1, Appendix 3, valid for a period of not more than six years, with the distinguishing mark
.....

However, this report shall be valid as a certificate of type approval within the meaning of ATP Annex 1, Appendix 1, paragraph 6 (a), only for a period of not more than six years, that is until
.....

Done at: .....

Date of test report: ....

Testing Officer

---

a) *If existing*
1 *Delete if not applicable.*
2 *Only for cooling appliances.*
3 *Increased by 35 % for new equipment.*
4 *Only for heating appliances*

MODEL No. 8

Section 3

Expert field check of the efficiency of cooling appliances of refrigerated equipment in service in accordance with ATP Annex 1, Appendix 2, sub-section 6.1

The check was conducted on the basis of report No ..... dated ....., issued by approved testing station/expert (name, address) .....

Cooling appliance:

- Description .....
- Manufacturer .....
- Type, serial number .....
- Date of manufacture (month/year) .....
- Nature of refrigerant .....
- Nominal refrigerant filling capacity specified by manufacturer ..... kg
- Actual filling of refrigerant used for test ..... kg
- Filling device (description, where situated) .....

Inside ventilation appliances: .....

- Description (number of appliances, etc.) .....
- Power of electric fans .....W
- Delivery rate .....m^3/h
- Dimensions of ducts: cross-section ..... m^2, length ..... m
- Condition of cooling appliance and ventilation appliances .....
- Inside temperature attained ..... °C
- At an outside temperature of ..... °C

Inside temperature of the equipment before the refrigerating appliance is started .....°C

Total running time of the refrigerating unit ..... h

Time between beginning of test and attainment of prescribed mean inside temperature of body ..... h

Check on operation of thermostat .....

For refrigerated equipment with eutectic plates:

Period of operation of the cooling appliance for freezing of the eutectic solution ..... h

Period during which inside air temperature is maintained after the appliance is switched of ..... h

Remarks: .....

According to the above test results, the equipment may be recognized by means of a certificate in accordance with ATP Annex 1, Appendix 3, valid for a period of not more than three years, with the distinguishing mark .....

Done at: .....

Date of test report: ....

Testing Officer

***MODEL No*. 9**

Section 3

Expert field check of the efficiency of cooling appliances of mechanically refrigerated equipment in service in accordance with ATP Annex 1, Appendix 2, sub-section 6.2

The check was conducted on the basis of report No .....dated ..... issued by approved testing station/expert (name, address) .....

Mechanical refrigerating appliances:

Manufacturer .....

Type, serial number .....

Date of manufacture (month/year) .....

Description .....

Effective refrigerating capacity specified by manufacturer for an outside temperature of +30 °C and an inside temperature of

0 °C ..... W

-10 °C ..... W

-20 °C ..... W

Refrigerant Charge:

Refrigerant fluid: (ISO/ASHRAE designation)[a)].....

Nominal mass of refrigerant .....

Inside ventilation appliances:

Description (number of appliances, etc.) .....

Power of electric fans ..... W

Delivery rate ..... m^3/h

Dimensions of ducts: cross-section ..... m^2, length ..... m

Condition of mechanical refrigerating appliance and inside ventilation appliances .....

Inside temperature attained ..... °C

At an outside temperature of ..... °C

and with a relative running time of .....%

Running time ..... h

Check on operation of thermostat .....

Remarks: .....

According to the above test results, the equipment may be recognized by means of a certificate in accordance with ATP Annex 1, Appendix 3 valid for a period of not more than three years, with the distinguishing mark .....

Done at: .....

Date of test report: ....

Testing Officer

[a)] *If existing*

MODEL No. 10

Section 3

Expert field check of the efficiency of heating appliances of heated equipment in service in accordance with ATP Annex 1, Appendix 2, sub-section 6.3

The check was conducted on the basis of report No. ..... dated .....
issued by approved testing station/expert (name, address) .....
Mode of heating: .....
Description .....
Manufacturer .....
Type, serial number .....
Date of manufacture (month/year) .....
Where situated .....
Overall area of heat exchange surfaces ..... m^2
Effective power rating as specified by manufacturer ..... kW
Inside ventilation appliances:
Description (number of appliances, etc.) .....
Power of electric fans ..... W
Delivery rate ..... m^3/h
Dimensions of ducts: cross-section ..... m^2, length
..... m
Condition of heating appliance and inside ventilation appliances .....
Inside temperature attained ..... °C
At an outside temperature of ..... °C
and with a relative running time of .....%
Running time ..... h
Check on operation of thermostat .....
Remarks: .....

According to the above test results, the equipment may be recognized by means of a certificate in accordance with ATP Annex 1, Appendix 3 valid for a period of not more than three years, with the distinguishing mark
.....

Done at: .....

Date of test report: ....

Testing Officer

***MODEL No*. 11**

Section 3

Expert field check of the efficiency of cooling and heating appliances of mechanically refrigerated and heated equipment in service in accordance with ATP Annex 1, Appendix 2, subsection 6.4

The check was conducted on the basis of report No. ..... dated ....., issued by approved testing station/expert (name, address) .....

Mechanical refrigerating appliances:

Manufacturer .....
Type, serial number .....
Date of manufacture (month/year) .....
Description .....
Effective refrigerating capacity stated by manufacturer for an outside temperature of + 30 °C and an inside temperature of:
0 °C ..... W
-10 °C ..... W
-20 °C ..... W

Refrigerant charge:

Refrigerant fluid: (ISO/ASHRAE designation)[a)] .....
Nominal mass of refrigerant .....

Heating appliance:

Description .....
Manufacturer .....
Type, serial number .....
Date of manufacture (month/year) .....
Where situated .....
Overall area of heat exchange surfaces ..... m^2
Effective power rating as specified by manufacturer ..... kW

Inside ventilation appliances:

Description (number of appliances, etc.) .....
Power of electric fans ..... W
Delivery rate ..... m^3/h
Dimensions of ducts: cross-section ..... m^2, length ..... m
Condition of cooling appliance, heating appliance and inside ventilation appliances .....

Inside temperature attained ..... °C

At an outside temperature of ..... °C
and with a relative running time of .....%
Running time ..... h

Check on operation of thermostat .....
Remarks: .....

According to the above test results, the equipment may be recognized by means of a certificate in accordance with ATP Annex 1, Appendix 3, valid for a period of not more than three years, with the distinguishing mark

.....
Done at: .....

Date of test report: ....
Testing Officer

[a)] *If existing*

MODEL No. 12

TEST REPORT

Prepared in conformity with the provisions of the Agreement on the International Carriage of Perishable Foodstuffs and on the Special Equipment to be Used for such Carriage (ATP)

Test Report No .....

Determination of the effective refrigerating capacity of a refrigeration unit in accordance with section 4 of ATP Annex 1, Appendix 2

Date of testing from DD/MM/YYYY to DD/MM/YYYY
Approved testing station
Name: .....
Address: .....
Refrigeration unit presented by: .....
(a) Technical specifications of the unit
Date of manufacture (month/year): .....
Make: .....
Type: ..... Serial No: .....
Category[1].....
Drive independent/dependent
Removable/not removable
Single unit/assembled components
Description: .....
Compressor: Make: ..... Type: .....
Number of cylinders: .....Cubic capacity: .....
Nominal speed of rotation: ..... rpm
Methods of drive[1]: electric motor, separate internal combustion engine, vehicle engine, vehicle motion, other
Compressor drive motor: [1,2]
Electrical: Make: ..... Type: .....
Power: ..... kW at ..... rpm
Supply voltage ..... V Supply frequency ..... Hz
Internal combustion engine: Make: ..... Type: .....
Number of cylinders: ..... Cubic capacity: .....
Power: ..... kW at ..... rpm
Fuel: .....
Hydraulic motor: Make: ..... Type: .....
Method of drive: .....
Alternator: Make: ..... Type: .....
Method of drive: ..... Other: .....

Speed of rotation:
nominal speed given by the manufacturer:..... rpm
minimum speed: ..... rpm
Refrigerant charge .....
Refrigerant fluid: (ISO/ASHRAE designation)[a)] .....
Nominal mass of refrigerant .....

Heat exchangers		Condenser	Evaporator
Make[2]			
Type (if applicable) [2]			
Number of tubes			
Fin pitch (mm) [2]			
Tube: nature and diameter (mm) [2]			
Exchange surface area (m^2) [2]			
Frontal area (m^2)			
FANS	Number		
	Number of blades per fan		
	Diameter (mm)		
	Nominal power (W) [2,3]		
	Total nominal output at a pressure of ..... Pa (m^3/h) [2]		
	Method of drive		

Expansion valve: Make: ..... Model: .....
Adjustable:[1] ..... Not adjustable:[1] .....
Defrosting device: .....
Automatic device: .....

Results of measurements and refrigerating performance
(Mean temperature of the air to the inlet(s) of the refrigeration unit ..... °C)

	Speed of rotation			Power of internal fan heater	Power absorbed by the unit cooler fan[4]	Fuel or electrical power consumption	Mean temperature around the body	Internal temperature		Effective refrigerating capacity
	Fans[3]	Alternator[3]	Compressor[3]					Mean	Inlet to evaporator	
	rpm	rpm	rpm	W	W	W or l/h	˚C	˚C	˚C	W
Nominal	.. ..	....	....	....	....	....	....	.. ..	....	....
Minimal	.. ..	....	....	....	....	....	....	.. ..	....	....

(b) Test method and results:

Test method[1]: heat balance method/enthalpy difference method
In a calorimeter box of mean surface area = ... m^2
measured value of the *U*-coefficient of a box fitted with a refrigeration unit:
..... W/°C,at a mean wall temperature of ..... °C.
In an item of transport equipment:
measured value of the *U*-coefficient of an item of transport equipment fitted with a refrigeration unit:
..... W/°C, at a mean wall temperature of ..... °C.
Method employed for the correction of the *U*-coefficient of the body as a function of the mean wall temperature of the body: .....
Maximum errors of determination of:
U-coefficient of the body .....
refrigerating capacity of the unit .....

(c) Checks

Temperature regulator: Setting ..... °C Differential ..... °C
Functioning of the defrosting device[1]: satisfactory/unsatisfactory
Air low volume leaving the evaporator: value measured ..... m^3/h at a static:

- differential pressure measured between the air lows leaving and entering the evaporator of 0 Pa,
- absolute barometric air pressure of ..... hPa.

Existence of a means of supplying heat to the evaporator for setting the thermostat between 0 and +12 °C: yes/no

(d) Remarks

According to the above test results, this report shall be valid as a certificate of type approval within the meaning of ATP Annex 1, Appendix 1, paragraph 6 (a) only for a period of not more than six years, that is until: .....

Done at: .....

Date of test report: ....

Testing Officer

---

a) *If existing*
1 *Delete where applicable.*
2 *Information indicated by the manufacturer.*
3 *Where applicable.*
4 *Enthalpy diference method only.*

MODEL No. 13

TEST REPORT

Prepared in conformity with the special provisions of the Agreement on the International Carriage of Perishable Foodstuffs and on the Special Equipment to be used for such carriage (ATP)

Test Report No .....

Determination of the effective refrigeration capacity of a refrigeration unit in accordance with Annex 1, Appendix 2, section 9 of ATP

Tests carried out from mm/dd/yyyy to mm/dd/yyyy

Approved testing station
Name: .....
Address: .....
Refrigerating unit presented by: .....
(a) Technical specifications of the unit:
Make/Brand .....
Type designation: .....
Type of liquefied gas: .....
Serial number: .....
Date of manufacture (month/year):.....
(The tested unit shall not have been built more than 1 year prior to ATP tests.)
Description: .....
Regulating valve (if different types of fans are used repeat information below for each type)
Make/Brand .....
Type: .....
Serial number: .....
Tank (if different types of fans are used repeat information below for each type)
Make/Brand .....
Type: .....
Serial number: .....
Capacity [l]: .....
Gas pressure at tank outlet: .....
Method of insulation: .....
Material of inner tank: .....
Material of outer tank: .....
Supply of liquefied gas ..... (internal pressure, pressure by heat exchanger, pump)
Pressure regulator
Make/Brand: .....
Type: .....
Serial number: .....
Gas pressure at pressure outlet: .....
Supply liquefied gas line (on the test bench)
Diameter: .....
Length: .....
Material: .....
Number of connections: .....
Defrosting device (Electric / Combustion unit)

Make/Brand: .....
Type: .....
Supply: .....
Declared heating capacity: .....

Regulator

Make/Brand: .....
Type: .....
Hardware version: .....
Software version: .....
Serial number: .....
Power supply: .....

Possibility for Multi-temperature operation: (yes/no)[1]
Number of compartments able to work in multi-temperatures:

Heat exchangers		Condenser	Evaporator
Make-Type			
Number of circuits			
Number of rows			
Number of blankets			
Number of tubes			
Fin pitch [mm]			
Tube : nature and diameter [mm][2]			
Total exchange surface [m²][2]			
Face area [m²]			
FANS	Make-Type		
	Number		
	Blade per fan		
	Diameter [mm]		
	Power [W]		
	Nominal speed [rpm] [2]		
	Total nominal output airflow [m^3/h] at a pressure of 0 Pa[2]		
	Method of drive (Description direct current / alternative, frequency, etc.)		

(b) Test method and results:

Test method: Heat balance method/enthalpy difference method
In a calorimeter box of mean surface area of = ... m^2
Measured value of the U-value of the calorimeter box fitted with the liquefied gas unit: ..... W/°C
At a mean wall temperature: ..... °C

In a transport equipment

Measured value of the U-value of the transport equipment fitted with the liquefied gas unit: ..... W/°C
At a mean wall temperature: .....°C
The formula employed for the correction of the U-value of the calorimeter box as a function of the mean wall temperature is: .....

Maximum errors of determination of:
U-value of the body: .....
Refrigerating capacity of the liquefied gas unit: .....

Mean air temperature at the tank outside: ……. °C Electric power supply:								
Liquefied gas consumption	Electrical consumption	Pressure at the tank outlet	Temperature of the liquid at the evaporator	External temperature	Internal temperature	Heating power	Evaporator air intake temperature	Useful refrigerating capacity
[kg/h]	[Vdc] and [A]	[bar abs]	[°C]	[°C]	[°C]	[W]	[°C]	[W]

Corrected cooling capacity [W]:

(c) Checks:
Temperature regulator: Setting ..... °C
Differential ..... °C
Functioning of the defrosting device[1]: satisfactory / unsatisfactory Airflow volume leaving the evaporator:
Value measured: ..... m^3/h
At a pressure of ..... Pa
At a temperature of ..... °C
At a rotation speed of ..... tr/min.
Minimum capacity tank: .....

(d) Remarks.....

This test report is valid for a maximum duration of six years after the date of the end of the tests.

Done at: .....

Date of test report: ....

Testing Officer

---

[1] *Delete where applicable.*
[2] *Information indicated by the manufacturer*

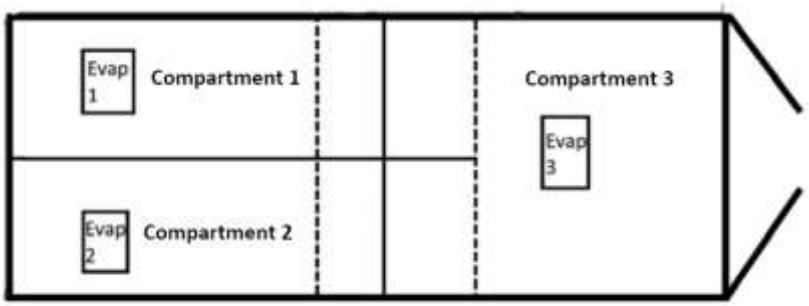
MODEL No. 14

Declaration of conformity for Multi Temperature – Multi compartment equipment Supplementary document to the Certificate of Compliance as per Annex 1, appendix 2 paragraph 7.3.6

Top view sketch of the lay-out of the equipment, indicating:

- front and rear, numbering of compartments;
- lay-out of the compartments with fixed and movable bulkheads and the following dimensions in centimeters: inside dimensions of the body, thickness and lengths of the bulkheads;
- most extreme position of movable dividing walls;
- Position of the host unit(s) and evaporators;
- material of the floor. (Example of top view sketch)

(Example of top view sketch)



Insulated body:

ATP test report number: .....

Make: .....

Serial number: .....

Host unit:

ATP Test report number: .....

Make: .....

Serial number: .....

Evaporators:

ATP test report number: .....

Make: .....

Type: .....

Remarks:

(for example, limitations in compartment temperatures or dimensions, use of particular accessories as curtains etc.)

Authentication

Name of competent authority: .....

Address: .....

Telephone number: .....

E-mail address: .....

Date and Place of signature: .....

Stamps, signature, and name signing officer: .....

9. PROCEDURE FOR MEASURING THE CAPACITY OF LIQUEFIED GAS UNITS AND DIMENSIONING THE EQUIPMENT THAT USES THESE UNITS

9.1 Definitions

a) A liquefied gas unit is composed of a tank containing liquefied gas, a regulating system, an interconnection system, a muffler if applicable and one or more evaporator;
b) Primary evaporator: any minimal structure comprising a liquefied gas unit intended to absorb thermal capacity in an insulated compartment;
c) Evaporator: any composition made up of primary evaporators located in an insulated compartment;
d) Maximum nominal evaporator: any composition made up of primary evaporators located in one or more insulated compartments;
e) Mono-temperature liquefied gas unit: liquefied gas unit made up of a liquefied gas tank connected to a single evaporator for regulating the temperature of a single insulated compartment;
f) Multi-temperature liquefied gas unit: liquefied gas unit made up of a liquefied gas tank connected to at least two evaporators, each regulating the temperature of a single, distinct insulated compartment in the same multi-compartment equipment;
g) Mono-temperature operation: operation of a mono- or multi-temperature liquefied gas unit in which a single evaporator is activated and maintains a single compartment in mono-compartment or multi-compartment equipment;
h) Multi-temperature operation: operation of a multi-temperature liquefied gas unit with two or more activated evaporators that maintain two different temperatures in insulated compartments in multi-compartment equipment;
i) Maximum nominal refrigerating capacity (*Pmax-nom*): the maximum specified refrigerating capacity set by the manufacturer of the liquefied gas unit;
j) Nominal installed refrigeration capacity (*Pnom-ins*): the maximum refrigeration capacity within the maximum nominal refrigerating capacity that can be provided by a given configuration of evaporators in a liquefied gas unit;
k) Individual refrigerating capacity (*Pind-evap*): the maximum refrigerating capacity generated by each evaporator when the liquefied gas unit is operating as a mono-temperature unit;
l) Effective refrigerating capacity (*Pef-frozen-evap*): the refrigerating capacity available to the lowest temperature evaporator when the liquefied gas unit is operating as described in paragraph 9.2.4.

9.2 Test procedure for liquefied gas units

9.2.1 General procedure

The test procedure shall be as specified in annex 1, appendix 2, section 4 of ATP, taking account of the following particularities.

The tests shall be conducted for the different primary evaporators. Each primary evaporator shall be tested on a separate calorimeter, if applicable, and placed in a temperature-controlled test cell.

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.

For multi-temperature liquefied gas units, the individual refrigerating capacity shall be measured for all primary evaporators, each operating in mono-temperature mode as specified in paragraph 9.2.3.

The refrigerating capacities are determined by using a liquefied gas tank provided by the manufacturer that allows a complete test to be carried out without intermediate refilling.

All the elements of the liquefied gas refrigeration unit shall be placed in a thermostatic enclosure maintained at an ambient temperature of 30 ± 0.5 °C.

For each test, the following shall also be recorded:

The flow, temperature and pressure of the liquefied gas emerging from the tank in use;

The voltage, electrical current and total electrical consumption absorbed by the liquefied gas unit
(i.e. fan…);

The gas flow is equal to the mean mass consumption of fluid throughout the test in question.

Except when determining the liquefied gas flow, each quantity shall be physically captured for a fixed period equal to or less than 10 seconds and each quantity shall be recorded for a fixed maximum period of 2 minutes, subject to the following:

Each temperature recorded at the air intake of the ventilated evaporator or each air temperature recorded inside the body of the non-ventilated evaporator shall comply with the expected class temperature ± 1 °C.

If the electrical components of the liquefied gas unit can be fed by more than one electrical power supply, the tests shall be repeated accordingly.

If the tests show equivalent maximum nominal refrigerating capacities, regardless of the operating mode of the liquefied gas refrigeration unit, then the tests may be restricted to a single electrical power supply mode, taking into account the potential impact on the air flow expelled by the evaporators, where applicable. Equivalence is demonstrated if:

$$\frac{2 \cdot \left| P_{nom-max,1} - P_{nom-max,2} \right|}{P_{nom-max,1} + P_{nom-max,2}} \leq 0,035$$

Where:
$P_{\text{nom-max,1}}$: The maximum nominal capacity of the liquefied gas unit for a given electrical power supply mode,
$P_{\text{nom-max,2}}$: The second maximum nominal capacity of the liquefied gas unit for a different electrical power supply mode.

9.2.2 Determination of the maximum nominal refrigerating capacity of the liquefied gas unit

The test shall be conducted at reference temperatures of -20 °C and 0 °C.

The nominal refrigerating capacity at -10 °C shall be calculated by linear interpolation of the capacities at -20 °C and 0 °C.

The maximum nominal refrigerating capacity of the regulating unit in mono-temperature operation shall be measured with the maximum nominal evaporator offered by the manufacturer. This evaporator is formed of the primary refrigeration evaporator(s).

The test shall be conducted with the unit operating at a single reference temperature, corresponding to the temperature of the air intake in the case of ventilated evaporators or the temperature of the air inside the body in the case of non-ventilated evaporators.

The maximum nominal refrigerating capacity shall be estimated at each level of temperature as follows:

A first test shall be carried out, for at least four hours, under control of the thermostat (of the refrigeration unit) to stabilize the heat transfer between the interior and exterior of the calorimeter box.

After re-filling of the tank (if needed), a second test shall be carried out for at least three hours for the measurement of the maximum nominal refrigerating capacity in which:

a) The set point of the liquefied gas unit shall be set to the chosen test temperature with a set point shift if necessary, in accordance with the instructions of the test sponsor;

b) The electrical power dissipated in the calorimeter box shall be adjusted throughout the test to ensure that the reference temperature remains constant.

The refrigerating capacity drift during this second test shall be lower than a rolling average of 5% per hour and shall not exceed 10% during the course of the test. If this is the case, the refrigeration capacity obtained corresponds to the minimum refrigeration capacity recorded during the course of the test.

Only for the measurement of the maximum nominal refrigerating capacity of the liquefied gas unit, a single additional test of one hour shall be conducted with the smallest tank sold with the unit to quantify the impact of its volume on the regulation of the refrigerating capacity. The new refrigerating capacity obtained shall not vary by more than 5% from the lower value or compared to the value found with the tank used for the tests of three hours or more. Where the impact is greater, a restriction on the volume of the tank shall be included in the official test report.

9.2.3 Determination of the individual refrigerating capacity of each primary evaporator of a liquefied gas unit

The individual refrigerating capacity of each primary evaporator shall be measured in mono-temperature operation. The test shall be conducted at -20 °C and 0 °C, as prescribed in paragraph 9.2.2.

The individual refrigerating capacity at -10 °C shall be calculated by linear interpolation of the capacities at -20 °C and 0 °C.

9.2.4 Determination of the remaining effective refrigerating capacity of a liquefied gas unit in multi-temperature operation at a reference heat load

Determination of the remaining effective capacity of a liquefied gas refrigeration unit requires the simultaneous use of two or three evaporators, as follows:

a) For a two-compartment unit, the evaporators with the highest and lowest individual refrigerating capacities;

b) For a unit with three or more compartments, the same evaporators as above and as many others as needed, with intermediate refrigerating capacity.

Setting of the reference heat load:

a) The set points of all but one of the evaporators shall be set in such a way as to obtain an air intake temperature, or, if not applicable, an air temperature inside the body, of 0 °C;

b) A heat load shall be applied to each calorimeter/ evaporator pair under control of the thermostat, except the one not selected;

c) The heat load shall be equal to 20% of the individual refrigerating capacity at -20 °C of each evaporator.

The effective capacity of the remaining evaporator shall be determined at an air intake temperature, or, if not applicable, an air temperature inside the body, of -20 °C.

Once the effective capacity of the remaining evaporator has been determined, the test shall be repeated after conducting a circular permutation of the temperature classes.

9.3 Refrigerating capacity of evaporators

Refrigeration evaporators can be created on the basis of refrigeration capacity tests carried out on primary evaporators. The refrigeration capacity and liquefied gas consumption of the evaporators equal the arithmetic sum of the refrigeration capacity and of the liquefied gas consumption, respectively, of the primary evaporators within the limit of the maximum nominal refrigerating capacity and of the associated flow of liquefied gas.

9.4 Dimensioning and certification of refrigerated multi-temperature liquefied gas equipment

The dimensioning and certification of refrigerated equipment using liquefied gas refrigeration units shall be carried out as prescribed in section 3.2.6 for mono-temperature equipment, with the following capacity equivalents:

$$P_{nom\text{-}ins} = P_{eff}$$ (effective refrigerating capacity)

or section 7.3 for multi-temperature refrigerating equipment, with the following capacity equivalents:

$$P_{max\text{-}nom} = P_{nominal}$$

In addition, the usable volume of liquefied gas tanks shall be such as to permit the liquefied gas unit to maintain the temperature for that class of equipment for a minimum of 12 hours.

Annex 1, Appendix 3

A. Model form of certificate of compliance of the equipment, as prescribed in Annex 1, Appendix 1, paragraph 3

FORM OF CERTIFICATE FOR INSULATED, REFRIGERATED, MECHANICALLY REFRIGERATED, HEATED OR MECHANICALLY REFRIGERATED AND HEATED EQUIPMENT USED FOR THE INTERNATIONAL CARRIAGE OF PERISHABLE FOODSTUFFS BY LAND

Certificates of compliance of equipment issued before 2 January 2011 in accordance with the requirements regarding the model of the certificate in Annex 1, Appendix 3 in force until 1 January 2011 shall remain valid until their original date of expiry.

Certificates of compliance issued before the date of entry into force of the modification to item 3 of the model certificate (30 September 2015) shall remain valid until their original date of expiry.

/ EQUIPMENT[1]

[2]	XXXXXXXXX [3]	INSULATED	REFRIGERATED	MECHANICALLY REFRIGERATED	HEATED	MECHANICALLY REFRIGERATED AND HEATED	MULTI-TEMPERATURE[4]

/ CERTIFICATE[5] **ATP XXXXXXXXX**

/ Issued pursuant to the Agreement on the International Carriage of Perishable Foodstuffs and on the Special Equipment to be Used for such Carriage (ATP)

1. / Issuing authority: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
2. / Equipment[6]: XXXXXXXXXXXXXXXXXXXX
3. / Registration number[*]: XXXXXXXXX Vehicle identification number[*] XXXXXXXXXXXXXXXXXXXX
/ allotted by: XXXXXXXXXXXXXXXXXXXX
Insulated box: **MAKE, MODEL, SERIAL NUMBER, MONTH AND YEAR OF MANUFACTURE [10]** XXXXXXXXXXXXXXXXXXXXXXXXXXXX
4. Owner or operated by: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
5. / Submitted by: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
6. / Is approved as:[7] XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
6.1 / With one or more thermal appliances which is (are)[1]:
6.1.1 / Independent:[8] **MAKE, MODEL, REFRIGERANT, SERIAL NUMBER/YEAR OF MANUFACTURE (If any)**
6.1.2 / Dependent :[8] **MAKE, MODEL, REFRIGERANT, SERIAL NUMBER/YEAR OF MANUFACTURE (If any)**
6.1.3 / Removable;
6.1.4 / Not removable.
7. / Basis of issue of certificate:
7.1 / This certificate is issued on the basis of:[1]
7.1.1 / Tests of the equipment;
7.1.2 / conformity with a reference item of equipment;
7.1.3 /A periodic inspection.
7.2 / Specify:
7.2.1 / The testing station: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
7.2.2 The nature of the tests:[9] XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
7.2.3 / The number(s) of the report(s):
NNNNNNNN (TESTING STATION) YYYY/MM/DD and NNNNNNNN (TESTING STATION) YYYY/MM/DD
7.2.4 / The K coefficient: **0.nn W/m².°C**
7.2.5 The effective refrigerating capacity at an outside temperature of 30 °C and an inside temperature of:[10]

[11]	Nominal capacity	Evap.1		Evap.2	Evap.3
°C	xxxxx W	xxxxx W		xxxxx W	xxxxx W
°C	xxxxx W	xxxxx W		xxxxx W	xxxxx W
°C	xxxxx W	xxxxx W		xxxxx W	xxxxx W

7.3 / Number of openings and special equipment **X**
7.3.1 / Number of doors: **X** / rear door **X** side door(s) **X**
7.3.2 / Number of vents: **X**
7.3.3 / Hanging meat equipment: **X**
7.4 / Others
8. / This certificate is valid until: **MONTH & YEAR**
8.1 / Provided that:
8.1.1 [a] The insulated body and, where applicable, the thermal appliance is maintained in good condition; and
8.1.2 / No material alteration is made to the thermal appliances;

9. / Done by: **XXXXXXXXXXXXXXXXXXX**
XXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXX
10. / On: **YYYY/MM/DD**

CERTIFIED DUPLICATE[12]
Do not print this stamp on the original Certificate
(Officer name)
(Competent or authorized authority)

LOGOTYPE[13]
Security stamp (relief, ultraviolet, etc.)
Original document

/ The competent authority
XXXXXXXXXXXXXXXXXXXXXXXXXX
[14]
/ Responsible for the ATP

(Officer name)

* / Not mandatory

_____

These footnotes shall not be printed on the certificate itself.

The areas in grey shall be replaced by the translation in the language of the country issuing the ATP Certificate.

[1] *Strike out what does not apply.*

[2] *Distinguishing sign of the country, as used in international road traffic.*

[3] *The number (figures, letters, etc.) indicating the authority issuing the certificate and the approval reference.*

[4] *The test procedure for new multi-temperature equipment appears in section 7 of annex 1, appendix 2. A test procedure for in-service multi-temperature equipment has not yet been determined. Multi-temperature equipment is insulated equipment with two or more compartments for different temperatures in each compartment.*

[5] *The blank certificate shall be printed in the language of the issuing country and in English, French or Russian; the various items shall be numbered as in the above model.*

[6] *State type (wagon, lorry, trailer, semi-trailer, container, etc.); in the case of tank equipment for carriage of liquid foodstuffs, add the word "tank".*

[7] *Enter here one or more of the descriptions listed in Appendix 4 of Annex 1, together with the corresponding distinguishing mark or marks.*

[8] *Write the make, model, refrigerant, serial number and year of manufacture of the equipment.*

[9] *Measurement of the overall coefficient of heat transfer, determination of the efficiency of cooling appliances, etc.*

[10] *Where determined in conformity with the provisions of Appendix 2, paragraph 3.2 of this Annex.*

[11] *The effective cooling capacity of each evaporator depends on the number of evaporators fixed at the condensing unit.*

[12] *In case of loss, a new Certificate can be provided or, instead of it, a photocopy of the ATP Certificate bearing a special stamp with "CERTIFIED DUPLICATE" (in red ink) and the name of the certifying officer, his signature, and the name of the competent authority or authorized body.*

[13] *Security stamp (relief, fluorescent, ultraviolet, or other safety mark that certifies the origin of the certificate).*

[14] *If applicable, mention the way the power for issuing ATP Certificates is delegated.*

[15] *Write the mark, model, serial number of the manufacturer and month and year of manufacture of the insulated body. All the serial numbers of insulated equipment (containers) having an internal volume of less than 2 m^3 shall be listed. It is also acceptable to collectively list these numbers, i.e. from number … to number.*

B. Certification plate of compliance of the equipment, as provided for in Annex 1, Appendix 1, paragraph 3

1. The certification plate shall be affixed to the equipment permanently and in a clearly visible place adjacent to any other approval plate issued for official purposes. The plate, conforming to the model reproduced below, shall take the form of a rectangular, corrosion-resistant and ire-resistant plate measuring at least 160 mm by 100 mm. The following particulars shall be indicated legibly and indelibly on the plate in at least the English or French or Russian language:

a) The Latin letters “ATP” followed by the words “APPROVED FOR TRANSPORT OF PERISHABLE FOODSTUFFS”;

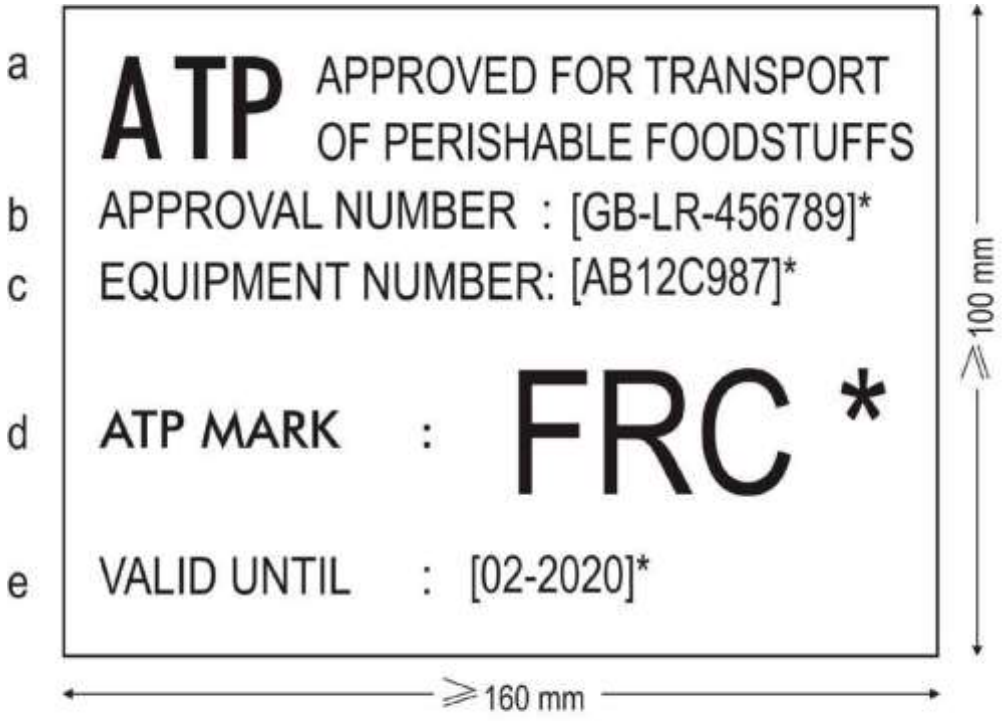
b) “APPROVAL NUMBER” followed by the distinguishing sign (in international road traffic) of the State in which the approval was granted and the number (figures, letters, etc.) of the approval reference;

c) “EQUIPMENT NUMBER” followed by the individual number assigned to identify the particular item of equipment (which may be the manufacturer’s number);

d) “ATP MARK” followed by the distinguishing mark prescribed in annex I, appendix 4, corresponding to the class and the category of the equipment;

e) “VALID UNTIL” followed by the date (month and year) when the approval of the unit of equipment expires. If the approval is renewed following a test or inspection, the subsequent date of expiry may be added on the same line.

2. The letters “ATP” and the letters of the distinguishing mark should be approximately 20 mm high. Other letters and figures should not be less than 5 mm high.



* The particulars in square brackets are given by way of example.

Annex 1, Appendix 4

DISTINGUISHING MARKS TO BE AFFIXED TO SPECIAL EQUIPMENT

The distinguishing marks prescribed in appendix 1, paragraph 4 to this annex shall consist of capital Latin letters in dark blue on a white ground. The height of the letters shall be at least 100 mm for the classification marks and at least 50 mm for the expiry dates. For special equipment, such as a laden vehicle with maximum mass not exceeding 3.5 t, the height of the classification marks could likewise be 50 mm and at least 25 mm for the expiry dates.

The classification and expiry marks shall at least be affixed externally on both sides in the upper corners near the front.

The marks shall be as follows:

Equipment	Distinguishing mark
Normally insulated equipment	IN
Heavily insulated equipment	IR
Class A refrigerated equipment with normal insulation	RNA
Class A refrigerated equipment with heavy insulation	RRA
Class B refrigerated equipment with heavy insulation	RRB
Class C refrigerated equipment with heavy insulation	RRC
Class D refrigerated equipment with normal insulation	RND
Class D refrigerated equipment with heavy insulation	RRD
Class A mechanically refrigerated equipment with normal insulation	FNA
Class A mechanically refrigerated equipment with heavy insulation	FRA
Class B mechanically refrigerated equipment with heavy insulation	FRB
Class C mechanically refrigerated equipment with heavy insulation	FRC
Class D mechanically refrigerated equipment with normal insulation	FND
Class D mechanically refrigerated equipment with heavy insulation	FRD
Class E mechanically refrigerated equipment with heavy insulation	FRE
Class F mechanically refrigerated equipment with heavy insulation	FRF
Class A heated equipment with normal insulation	CNA
Class A heated equipment with heavy insulation	CRA
Class B heated equipment with heavy insulation	CRB
Class C heated equipment with heavy insulation	CRC
Class D heated equipment with heavy insulation	CRD
Class A mechanically refrigerated and heated equipment with normal insulation	BNA
Class A mechanically refrigerated and heated equipment with heavy insulation	BRA
Class B mechanically refrigerated and heated equipment with heavy insulation	BRB
Class C mechanically refrigerated and heated equipment with heavy insulation	BRC
Class D mechanically refrigerated and heated equipment with heavy insulation	BRD
Class E mechanically refrigerated and heated equipment with heavy insulation	BRE
Class F mechanically refrigerated and heated equipment with heavy insulation	BRF
Class G mechanically refrigerated and heated equipment with heavy insulation	BRG
Class H mechanically refrigerated and heated equipment with heavy insulation	BRH
Class I mechanically refrigerated and heated equipment with heavy insulation	BRI
Class J mechanically refrigerated and heated equipment with heavy insulation	BRJ
Class K mechanically refrigerated and heated equipment with heavy insulation	BRK
Class L mechanically refrigerated and heated equipment with heavy insulation	BRL

In the case of multi-compartment road equipment divided in two compartments the equipment mark shall consist in the distinguishing marks of each compartment (example: FRC-FRA) starting with the compartment located at the front or on the left side of the equipment.

In the case of other multi-compartment equipment, the distinguishing mark shall be selected only for the highest ATP class, i.e. the class that permits the highest difference between inside and outside temperatures, and supplemented by the letter M (example: FRC-M).

This marking is mandatory for all equipment built from 1 October 2020.

If the equipment is fitted with a removable or dependent thermal appliance and if special conditions exist for the use of the thermal appliance, the distinguishing mark or marks shall be supplemented by the letter X in the following cases:

1. FOR REFRIGERATED EQUIPMENT:

   Where the eutectic plates have to be placed in another chamber for freezing;

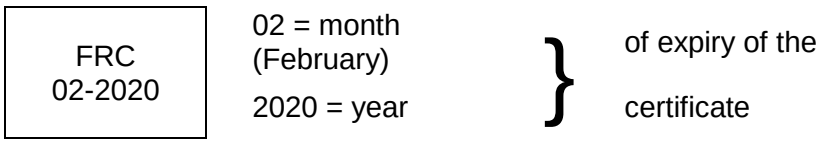
2. FOR MECHANICALLY REFRIGERATED EQUIPMENT AND MECHANICALLY REFRIGERATED AND HEATED EQUIPMENT:

   2.1 Where the compressor is powered by the vehicle engine;

   2.2 Where the refrigeration or refrigeration-heating unit itself or a part is removable, which would prevent its functioning.

   The date (month, year) entered under section A, item 8 in appendix 3 of this annex as the date of expiry of the certificate issued in respect of the equipment shall be quoted under the distinguishing mark or marks aforesaid.

   Model:



Annex 2

SELECTION OF EQUIPMENT AND TEMPERATURE CONDITIONS TO BE OBSERVED FOR THE CARRIAGE OF QUICK (DEEP)-FROZEN AND FROZEN FOODSTUFFS

1. For the carriage of the following quick (deep)-frozen and frozen foodstuffs, the transport equipment has to be selected and used in such a way that during carriage the highest temperature of the foodstuffs at any point of the load does not exceed the indicated temperature.

   By that means the equipment used for the transport of quick-frozen foodstuffs shall be fitted with the device referred to in appendix 1 to this annex. If however one should proceed to the verification of the temperature of the foodstuff, this shall be done according to the procedure laid down in appendix 2 to this annex.

2. Accordingly, the temperature of the foodstuffs at any point in the load must be at or below the indicated value on loading, during carriage and on unloading.

3. Where it is necessary to open the equipment, e.g. to carry out inspections, it is essential to ensure that the foodstuffs are not exposed to procedures or conditions contrary to the objectives of this annex and those of the International Convention on the Harmonization of Frontier Controls of Goods.

4. During certain operations, such as defrosting the evaporator of mechanically refrigerated equipment, a brief rise of the temperature of the surface of the foodstuffs of not more than 3 °C in a part of the load, e.g. near the evaporator, above the appropriate temperature may be permitted.

   Ice cream .....–20 °C

   Frozen or quick (deep)-frozen fish, fish products, molluscs and crustaceans and all other quick (deep)-frozen foodstuffs–18 °C

   All other frozen foodstuffs (except butter) .....–12 °C

   Butter.....–10 °C

   Deep-frozen and frozen foodstuffs mentioned below to be immediately further processed at destination:

   Butter
   Concentrated fruit juice

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1 The deep-frozen and frozen foodstuffs listed, when intended for immediate further processing at destination, may be permitted gradually to rise in temperature during carriage so as to arrive at their destination at temperatures no higher than those specified by the sender and indicated in the transport contract. This temperature should not be higher than the maximum temperature authorized for the same foodstuff when refrigerated as mentioned in annex 3. The transport document shall state the name of the foodstuff, whether it is deep-frozen or frozen and that it is immediately to be further processed at destination. This carriage shall be undertaken with ATP-approved equipment without use of a thermal appliance to increase the temperature of the foodstuffs1

Annex 2, Appendix 1

MONITORING OF AIR TEMPERATURE FOR TRANSPORT OF QUICK-FROZEN PERISHABLE FOODSTUFFS

The transport equipment shall be fitted with an instrument capable of measuring and recording air temperatures and storing the data obtained (hereinafter referred to as the instrument) to monitor the air temperatures to which quick-frozen foodstuffs intended for human consumption are subjected.

The instrument shall be verified in accordance with EN 13486:2002 by an accredited body and the documentation shall be available for the approval of ATP competent authorities.

The instrument shall comply with standard EN 12830:2018.

Temperature recorders in service that comply with EN 12830:1999 may continue to be used.

Temperature recordings obtained in this manner must be dated and stored by the operator for at least one year or longer, according to the nature of the food.

Annex 2, Appendix 2

PROCEDURE FOR THE SAMPLING AND MEASUREMENT OF TEMPERATURE FOR CARRIAGE OF CHILLED, FROZEN AND QUICK-FROZEN PERISHABLE FOODSTUFFS

A. GENERAL CONSIDERATIONS

1. Inspection and measurement of temperatures stipulated in annexes 2 and 3 should be carried out so that the foodstuffs are not exposed to conditions detrimental to the safety or quality of the foodstuffs. Measuring of food temperatures should be carried out in a refrigerated environment, and with the minimum delays and minimum disruption of transport operations.

2. Inspection and measurement procedures, as referred to in paragraph 1, shall preferably be carried out at the point of loading or unloading. These procedures should not normally be carried out during transport, unless serious doubt exists about the conformity of the temperatures of the foodstuffs stipulated in annexes 2 and 3.

3. Where possible, the inspection should take account of information provided by temperature monitoring devices during the journey before selecting those loads of perishable foodstuffs for sampling and measurement procedures. Progression to temperature measurement of the food should only be undertaken where there is reasonable doubt of the temperature control during carriage.

4. Where loads have been selected, a non-destructive measurement (between-case or between-pack) should at first be used. Only where the results of the non-destructive measurement do not conform with the temperatures laid down in annexes 2 or 3 (taking into account allowable tolerances), are destructive measurements to be carried out. Where consignments or cases have been opened for inspection, but no further action has been taken, they should be resealed giving the time, date, place of inspection, and the official stamp of the inspection authority.

B. SAMPLING

5. The types of package selected for temperature measurement shall be such that their temperature is representative of the warmest point of the consignment.

6. Where it is necessary to select samples during transport whilst the consignment is loaded, two samples should be taken from the top and bottom of the consignment adjacent to the opening edge of each door or pair of doors.

7. Where samples are taken during unloading of the consignment, four samples should be chosen from any of the following locations:
   - top and bottom of the consignment adjacent to the opening edge of the doors;
   - top rear corners of the consignment (i.e. furthest away from the refrigeration unit);
   - centre of the consignment;

   - centre of the front surface of the consignment (i.e. closest to the refrigeration unit);
   - top or bottom corners of the front surface of the consignment (i.e. closest to the return air intake of the refrigeration unit).

8. In the case of chilled foods in annex 3, samples should also be taken from the coldest

location to ensure that freezing has not occurred during transportation.

C. TEMPERATURE MEASUREMENT OF PERISHABLE FOODSTUFFS

9. The temperature measuring probe should be precooled to as close to the product temperature as possible before measurement.

I. Chilled foods

10. Non-destructive measurement. Measurement between-case or between-pack should be made with a probe with a flat head, which gives a good surface contact, low thermal mass, and high thermal conductivity. When placing the probe between the cases or food packs, there should be sufficient pressure to give a good thermal contact, and sufficient length of probe inserted to minimize conductivity errors.

11. Destructive measurement. A probe with a rigid, robust stem and sharpened point should be used, made from a material which is easy to clean and disinfect. The probe should be inserted into the centre of the food pack, and the temperature noted when a steady reading is reached.

II. Frozen and quick-frozen foods

12. Non-destructive measurement. Same as paragraph 10.

13. Destructive measurement. Temperature probes are not designed to penetrate frozen foods. Therefore, it is necessary to make a hole in the product in which to insert the probe. The hole is made by a precooled product penetration instrument, which is a sharp pointed metallic instrument such as an ice punch, hand drill or an auger. The diameter of the hole should provide a close it to that of the probe. The depth to which the probe is inserted will depend on the type of product:

(i) Where product dimensions allow, insert the probe to a depth of 2.5 cm from the surface of the product;

(ii) Where (i) is not possible because of the size of the product, the probe should be inserted to a minimum depth from the surface of 3 to 4 times the diameter of the probe;

(iii) It is not possible or practical to make a hole in certain foods because of their size or composition e.g. diced vegetables. In these cases, the internal temperature of the food package should be determined by insertion of a suitable sharp-stemmed probe to the centre of the pack to measure the temperature in contact with the food.

After inserting the probe, the temperature should be read when it has reached a steady value.

D. GENERAL SPECIFICATIONS FOR THE MEASURING SYSTEM

14. The measuring system (probe and read-out) used in determining temperature shall meet the following specifications:

(i) the response time should achieve 90% of the difference between the initial and final reading within three minutes;

(ii) the system must have an accuracy of ± 0.5 °C within the measurement range -20 °C to + 30 °C[1];

(iii) the measuring accuracy must not change by more than 0.3 °C during operation in the ambient temperature range -20 °C to + 30 °C;

(iv) the display resolution of the instrument should be 0.1 °C;

(v) the accuracy of the system should be checked at regular intervals;

(vi) the system should have a current certificate of calibration from an approved institution;

(vii) the electrical components of the system should be protected against undesirable effects due to condensation of moisture;

(viii) the system should be robust and shock proof.

E. ALLOWABLE TOLERANCES IN THE MEASUREMENT OF TEMPERATURE

15. Certain tolerances should be allowed in the interpretation of temperature measurements:

(i) operational - in the case of frozen and quick-frozen foods, a brief rise of up to 3 °C on the temperature permitted in annex 2 is allowed for the surface temperature of the food;

(ii) methodology - non-destructive measurement can give up to a maximum of 2°C difference in the reading compared to the true product temperature measurement, especially with the thickness of cardboard in case packaging. This tolerance does not apply to the destructive measurement of temperature.

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[1] *The procedure will be defined.*

Annex 3

SELECTION OF EQUIPMENT AND TEMPERATURE CONDITIONS TO BE OBSERVED FOR THE CARRIAGE OF CHILLED FOODSTUFFS

1. For the carriage of the following chilled foodstuffs, the transport equipment has to be selected and used in such a way that during carriage the highest temperature of the foodstuffs at any point of the load does not exceed the indicated temperature. If, however, the verification of the temperature of the foodstuff is carried out, it shall be done according to the procedure laid down in Appendix 2 to Annex 2 to this Agreement.

2. Accordingly, the temperature of the foodstuffs at any point in the load must not exceed the temperature as indicated below on loading, during carriage and on unloading.

3. Where it is necessary to open the equipment, e.g. to carry out inspections, it is essential to ensure that the foodstuffs are not exposed to procedures or conditions contrary to the objectives of this Annex and those of the International Convention on the Harmonization of Frontier Controls of Goods.

4. The temperature control of foodstuffs specified in this Annex should be such as not to cause freezing at any point of the load.

		Maximum temperature
I.	Raw milk[1]	+ 6 ˚C
II.	Red meat[2] and large game (other than red offal)	+ 7 ˚C
III.	Meat products[3], pasteurized milk, butter, fresh dairy products (yoghurt, kefir, cream and fresh cheese[4]), ready cooked foodstuffs (meat, fish, vegetables), ready to eat prepared raw vegetables and vegetable products[5], concentrated fruit juice and fish products[3] not listed below	Either at + 6 °C or at temperature indicated on the label and/or on the transport documents
IV.	Game (other than large game), poultry[2] and rabbits	+ 4 ˚C
V.	Red offal[2]	+ 3 ˚C
VI.	Minced meat[2]	Either at +2 °C or at temperature indicated on the label and/or on the transport documents
VII.	Untreated fish, molluscs and crustaceans[6]	On melting ice or at temperature of melting ice

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1 *When milk is collected from the farm for immediate processing, the temperature may rise during carriage to +10 °C.*

2 *Any preparations thereof.*

3 *Except for products fully treated by salting, smoking, drying or sterilization.*

4 *"Fresh cheese" means a non-ripened (non-matured) cheese which is ready for consumption shortly after manufacturing and which has a limited conservation period.*

5 *Raw vegetables which have been diced, sliced or otherwise size reduced, but excluding those which have only been washed, peeled or simply cut in half.*

6 *Except for live fish, live molluscs and live crustaceans.*

SPORAZUM O MEĐUNARODNOM PREVOZU LAKOKVARLjIVIH NAMIRNICA I SPECIJALNIM SREDSTVIMA ZA NjIHOV PREVOZ (ATP)

STRANE UGOVORNICE

U ŽELjI da poboljšaju uslove očuvanja kvaliteta lakokvarljivih namirnica za vreme njihovog prevoza, posebno u međunarodnoj razmeni,

SMATRAJUĆI da poboljšanje ovih uslova očuvanja može doprineti razvoju trgovine lakokvarljivih namirnica,

DOGOVORILE su se o sledećem:

Glava I

SPECIJALNA TRANSPORTNA SREDSTVA

Član 1.

U međunarodnom prevozu lakokvarljivih namirnica „izotermička transportna sredstva", „rashladna transportna sredstva", „transportna sredstva-hladnjače", „transportna sredstva za zagrevanje" ili „transportna sredstva-hladnjače sa mogućnošću zagrevanja" su samo ona transportna sredstva koja odgovaraju definicijama i normama iznetim u Prilogu br. 1 ovog sporazuma.

Član 2.

Strane ugovornice preduzimaju potrebne mere da obezbede da transportna sredstva pomenuta u članu 1. ovog sporazuma budu kontrolisana i ispitana prema odredbama Dodataka br. 1, 2, 3 i 4 Priloga br. 1 ovog sporazuma. Svaka strana ugovornica priznaje sertifikat o saobraznosti izdat u skladu sa tačkom 3. Dodatka br. 1 Priloga br. 1 od strane nadležnog organa druge strane ugovornice. Svaka strana ugovornica može priznati važnost sertifikata o saobraznosti koje, poštujući uslove predviđene u Dodacima br. 1 i 2 Priloga br. 1 ovog sporazuma, izdaju nadležni organi države koja nije strana ugovornica.

Glava II

UPOTREBA SPECIJALNIH SREDSTAVA ZA MEĐUNARODNI PREVOZ IZVESNIH LAKOKVARLjIVIH NAMIRNICA

Član 3.

1. Odredbe navedene u članu 4. ovog sporazuma primenjuju se na svaki prevoz, za račun drugoga ili za sopstveni račun, koji se isključivo obavlja, sa izuzetkom odredaba iz tačke 2. ovog člana, železnicom ili drumom ili u kombinaciji jednog i drugog:

- duboko smrznutih ili smrznutih namirnica, i

- namirnica navedenih u Prilogu br. 3 ovog sporazuma, čak iako nisu ni duboko smrznute ni smrznute,

ukoliko se mesto na kojem se roba ili transportno sredstvo koje sadrži ovu robu utovaruje u železničko ili drumsko vozilo i mesto na kojem se roba ili transportno sredstvo koje sadrži ovu robu

istovaruje, nalaze u dve različite države, a ukoliko se mesto istovara robe nalazi na teritoriji jedne strane ugovornice.
U slučaju prevoza koji obuhvata jednu ili više pomorskih linija, osim onih koje se spominju u tački 2. ovog člana, svaka kopnena linija treba da se posmatra posebno.

2. Odredbe iz tačke 1. ovog člana primenjuju se i na pomorske linije kraće od 150 km, pod uslovom da je roba otpremljena transportnim sredstvima koja se upotrebljavaju za jedan ili više transporta kopnom bez pretovara i da ove pomorske linije dolaze pre ili posle jednog ili više transporta kopnom spomenutim u tački 1. ovog člana ili se obavljaju između dva takva transporta.

3. Bez obzira na odredbe iz tačaka 1. i 2. ovog člana, strane ugovornice odredbe člana 4. ovog sporazuma ne moraju da primenjuju na prevoz namirnica koje nisu namenjene za ljudsku upotrebu.

Član 4.

1. Za prevoz lakokvarljivih namirnica navedenih u Prilozima br. 2 i 3 ovog sporazuma, treba da se koriste transportna sredstva pomenuta u članu 1. ovog sporazuma, osim ako temperature koje se predviđaju za svo vreme trajanja prevoza čine ovu obavezu očigledno nepotrebnom za održavanje uslova u pogledu temperatura utvrđenih u Prilozima br. 2 i 3 ovog sporazuma. Izbor i korišćenje tih transportnih sredstava treba da omoguće da se poštuju temperaturni uslovi utvrđeni u ovim prilozima za vreme čitavog prevoza. Osim toga, treba preduzeti sve potrebne mere, naročito u pogledu temperature namirnica u trenutku utovara i smrzavanja, ponovnog smrzavanja za vreme puta ili drugih potrebnih radnji. Međutim, odredbe iz ove tačke primenjuju se samo ako nisu u suprotnosti sa međunarodnim obavezama u pogledu međunarodnog prevoza, koje proističu za strane ugovornice iz konvencija koje su na snazi u vreme stupanja na snagu ovog sporazuma ili iz konvencija kojima one budu zamenjene.

2. Ako za vreme prevoza koji podleže odredbama ovog sporazuma nisu bile poštovane odredbe iz tačke 1. ovog člana:

a) niko na teritoriji jedne strane ugovornice ne može raspolagati namirnicama posle izvršenog prevoza ukoliko nadležni organ te strane ugovornice u skladu sa zahtevima javne higijene ne izda odgovarajuće odobrenje i ukoliko se pri tome ne budu poštovali uslovi koje je eventualno postavio taj organ prilikom davanja odobrenja.

b) svaka strana ugovornica može, iz razloga javne higijene ili profilakse životinja i ako to nije nespojivo sa drugim međunarodnim obavezama o kojima je reč u poslednjoj rečenici tačke 1. ovog člana, zabraniti uvoz prehrambenih proizvoda na svoju teritoriju ili ga podvrgnuti uslovima koje ona utvrdi.

3. Prevoznici za račun drugog dužni su da poštuju odredbe iz tačke 1. ovog člana samo ukoliko budu pristali da obezbede ili pruže usluge pod uslovom da se te odredbe poštuju i ako je to poštovanje vezano za izvršenje tih usluga. Ako su druga lica, fizička ili pravna, prihvatila da obezbede ili pruže usluge pod uslovom da se poštuju odredbe ovog sporazuma, ona su dužna da obezbede to poštovanje ako je ono vezano za izvršenje usluga koje su ona prihvatila da obezbede ili pruže.

4. Za vreme prevoza koji podleže zahtevima ovog sporazuma, a čije se mesto utovara nalazi na teritoriji jedne strane ugovornice, o poštovanju odredaba iz tačke 1. ovog člana, pod rezervom odredaba tačke 3. ovog člana stara se:

- kada se radi o transportu za račun drugog, fizičko ili pravno lice, koje je prema ispravi o prevozu pošiljalac ili, ako isprava o prevozu ne postoji, fizičko ili pravno lice, koje je sa prevoznikom zaključilo ugovor o prevozu;

- u drugim slučajevima, fizičko ili pravno lice, koje vrši prevoz.

Glava III

RAZNE ODREDBE

Član 5.

Odredbe ovog sporazuma ne primenjuju se na prevoz kopnom koji se obavlja putem izotermičkih pomorskih kontejnera bez pretovara robe, pod uslovom da ovim prevozima prethodi ili se posle njih obavlja drugi prevoz morem, osim onih koji su spomenuti u članu 3. tačka 2. ovog sporazuma.

Član 6.

1. Svaka strana ugovornica preduzima sve što je potrebno da bi obezbedila poštovanje odredaba ovog sporazuma. Nadležni organi strana ugovornica redovno se obaveštavaju o opštim merama preduzetim u tu svrhu.

2. Ako neka strana ugovornica utvrdi prekršaj koji počini neko lice koje boravi na teritoriji neke druge strane ugovornice, ili mu izrekne kaznu, uprava prve strane obaveštava upravu druge strane o prekršaju koji je konstatovan, kao i o kazni koja je izrečena.

Član 7.

Strane ugovornice zadržavaju pravo da se putem dvostranih ili višestranih sporazuma dogovore o tome da odredbe koje se primenjuju, kako na specijalna transportna sredstva, tako i na temperature na kojima neke namirnice moraju da se drže prilikom prevoza, treba da budu strože od odredaba predviđenih u ovom sporazumu, naročito zbog posebnih klimatskih uslova. Ove odredbe se primenjuju samo na međunarodni prevoz koji se vrši između strana ugovornica koje budu zaključile dvostrane ili višestrane sporazume spomenute u ovom članu. Ovi sporazumi se dostavljaju generalnom sekretaru Organizacije ujedinjenih nacija koji ih dostavlja stranama ugovornicama u ovom sporazumu koje nisu potpisale te sporazume.

Član 8.

Nepoštovanje odredaba ovog sporazuma ne ide na štetu niti postojanja niti važnosti ugovora zaključenih u cilju izvršenja prevoza.

Glava IV

ZAVRŠNE ODREDBE

Član 9.

1. Države članice Ekonomske komisije za Evropu i zemlje primljene u Komisiju kao savetodavni članovi prema tački 8. mandata ove Komisije mogu postati strane ugovornice ovog sporazuma,

a) ako ga potpišu;

b) ako ga ratifikuju pošto su ga potpisale pod rezervom ratifikacije; ili

c) ako mu pristupe.

2. Države koje mogu učestvovati u nekim poslovima Ekonomske komisije za Evropu u primeni tačke 11. mandata ove Komisije, mogu postati strane ugovornice ovog sporazuma ako mu pristupe posle njegovog stupanja na snagu.

3. Ovaj sporazum je otvoren za potpisivanje do 31. maja 1971. zaključno. Posle ovog datuma sporazum je otvoren za pristupanje.

4. Ratifikovanje ili pristupanje vrši se deponovanjem instrumenata kod generalnog sekretara Organizacije ujedinjenih nacija.

Član 10.

1. Svaka država može, prilikom potpisivanja ovog sporazuma bez rezerve o ratifikaciji ili prilikom deponovanja svog instrumenta o ratifikovanju ili pristupanju ili u svakom kasnijem trenutku, izjaviti putem saopštenja upućenog generalnom sekretaru Organizacije ujedinjenih nacija da se ovaj sporazum ne primenjuje na prevoze koji se vrše na svim njenim teritorijama van Evrope ili na nekoj od njih. Ako se ovo saopštenje učini posle stupanja na snagu Sporazuma za državu koja je uputila saopštenje, Sporazum prestaje da se primenjuje na teritoriju ili na teritorije navedene u saopštenju devedeset dana od dana kada generalni sekretar primi ovo saopštenje. Nove strane ugovornice koje pristupaju ATP-u od 30. aprila 1999. i primenjuju tačku 1. ovog člana neće biti pozvane da razmatraju amandmane u skladu sa procedurom navedenom u članu 18. tačka 2.

2. Svaka država koja da izjavu prema tački 1. ovog člana može, u svako doba, kasnije, izjaviti, putem saopštenja upućenog generalnom sekretaru, da se Sporazum primenjuje na prevoze na teritoriji označenoj u saopštenju shodno tački 1. ovog člana, a Sporazum se primenjuje na prevoze na ovoj teritoriji sto osamdeset dana od dana kada generalni sekretar primi ovo saopštenje.

Član 11.

1. Ovaj sporazum stupa na snagu godinu dana pošto ga pet država pomenutih u tački 1. člana 9. potpišu bez rezerve o ratifikovanju ili deponuju svoj instrument o ratifikovanju ili pristupanju.

2. Za svaku državu koja ratifikuje ovaj sporazum ili mu pristupi pošto ga pet zemalja bude potpisalo bez rezerve o ratifikovanju ili bude deponovalo svoj instrument o ratifikovanju ili pristupanju, Sporazum stupa na snagu godinu dana posle deponovanja instrumenata o ratifikovanju ili pristupanju ove države.

Član 12.

1. Svaka strana ugovornica može otkazati ovaj sporazum putem saopštenja upućenog generalnom sekretaru Organizacije ujedinjenih nacija.

2. Otkazivanje ima dejstvo po isteku petnaest meseci od dana kada generalni sekretar o tome primi saopštenje.

Član 13.

Ovaj sporazum prestaje da proizvodi dejstvo ako je, posle njegovog stupanja na snagu, u bilo kojem periodu od dvanaest uzastopnih meseci broj strana ugovornica manji od pet.

Član 14.

1. Svaka država može, prilikom potpisivanja ovog sporazuma bez rezerve o ratifikovanju ili deponovanju svog instrumenta o ratifikovanju ili pristupanju, ili u svako doba, kasnije, izjaviti, putem saopštenja upućenog generalnom sekretaru Organizacije ujedinjenih nacija, da se ovaj sporazum primenjuje na sve ili neke teritorije koje ona predstavlja na međunarodnom planu. Ovaj sporazum se primenjuje na teritoriju ili na teritorije navedene u saopštenju počev od devedesetog dana od dana kada generalni sekretar primi ovo saopštenje ili, ako tog dana Sporazum još nije stupio na snagu, počev od njegovog stupanja na snagu.

2. Svaka država koja, shodno tački 1. ovog člana, da izjavu o primenljivosti ovog sporazuma na neku teritoriju koju ona predstavlja na međunarodnom planu, može, shodno članu 12, otkazati ovaj sporazum u pogledu te teritorije.

Član 15.

1. Svaki spor između dve ili više strana ugovornica koji se odnosi na tumačenje ili primenu ovog sporazuma rešava se, ukoliko je to moguće, putem pregovora između strana u sporu.

2. Svaki spor koji nije rešen putem pregovora podnosi se na arbitražu ako bilo koja strana ugovornica u sporu to zatraži i iznosi se, shodno tome, pred jednog ili više arbitara koje zajednički biraju strane u sporu. Ako u roku od tri meseca od dana zahteva za arbitražu strane u sporu ne mogu da se sporazumeju u pogledu izbora jednog ili više arbitara, svaka strana može tražiti od generalnog sekretara Organizacije ujedinjenih nacija da imenuje arbitra pojedinca pred koga iznosi spor na rešavanje.

3. Odluka arbitra ili arbitara imenovanih shodno prethodnom stavu, obavezna je za strane ugovornice u sporu.

Član 16.

1. Svaka država može, prilikom potpisivanja ili ratifikovanja ovog sporazuma ili prilikom pristupanja, izjaviti da smatra da je ne obavezuju tačke 2. i 3. člana 15. ovog sporazuma. Na osnovu ovih tačaka i ostale strane ugovornice nisu u obavezi prema svakoj strani ugovornici koja stavi ovakvu rezervu.
2. Svaka strana ugovornica koja stavi rezervu, shodno tački 1. ovog člana, može u svako vreme povući ovu rezervu putem saopštenja upućenog generalnom sekretaru Organizacije ujedinjenih nacija.

3. Osim rezerve predviđene u tački 1. ovog člana, nikakva druga rezerva na ovaj sporazum nije dozvoljena.

Član 17.

1. Po isteku tri godine od dana stupanja na snagu ovog sporazuma, svaka strana ugovornica može, putem saopštenja upućenog generalnom sekretaru Organizacije ujedinjenih nacija, zatražiti sazivanje konferencije radi revizije ovog sporazuma. Generalni sekretar obaveštava o tom zahtevu sve strane ugovornice i saziva konferenciju za reviziju ako mu, u roku od četiri meseca od dana

kada uputi ovo saopštenje, najmanje jedna trećina strana ugovornica dostavi svoju saglasnost sa ovim zahtevom.

2. Ako se sazove konferencija u skladu sa tačkom 1. ovog člana, generalni sekretar o tome obaveštava sve strane ugovornice i poziva ih da u roku od tri meseca podnesu predloge koje žele da se na konferenciji razmotre. Generalni sekretar dostavlja svim stranama ugovornicama privremeni dnevni red konferencije, kao i tekst ovih predloga, najkasnije tri meseca pre otvaranja konferencije.

3. Generalni sekretar poziva na svaku konferenciju, koja je sazvana prema ovom članu, sve države o kojima je reč u članu 9. tačka 1. ovog sporazuma, kao i zemlje koje su postale strane ugovornice na osnovu tačke 2. ovog člana.

Član 18.

1. Svaka strana ugovornica može predložiti jednu ili više izmena ovog sporazuma. Tekst svakog predloga izmene dostavlja se generalnom sekretaru Organizacije ujedinjenih nacija koji ga upućuje svim stranama ugovornicama i o njemu obaveštava druge države o kojima je reč u tački 1. člana 9. ovog sporazuma.

Generalni sekretar takođe može predložiti amandmane na ovaj Sporazum ili njegove priloge koje mu dostavi Radna grupa za transport lakokvarljivih namirnica Komiteta za unutrašnji transport Ekonomske komisije za Evropu.

2. U roku od šest meseci, računajući od dana kada generalni sekretar dostavi predlog izmene, svaka strana ugovornica može obavestiti generalnog sekretara:

a) bilo da ima primedbu na predloženu izmenu,

b) bilo da, iako ima nameru da prihvati predlog, uslovi potrebni za to prihvatanje nisu još ispunjeni u njenoj zemlji.

3. Sve dok strana ugovornica koja je uputila obaveštenje predviđeno u gornjoj tački 2. pod b) ovog člana, ne saopšti generalnom sekretaru da usvaja izmenu, ona može, tokom devet meseci od dana isteka šestomesečnog roka predviđenog za obaveštenje, staviti primedbu na predloženu izmenu.

4. Ukoliko je neka primedba stavljena na predlog izmene pod uslovima predviđenim u tačkama 2. i 3. ovog člana, izmena se smatra neprihvaćenom i ostaje bez dejstva.

5. Ukoliko nije bilo nikakvih primedbi na predlog izmene pod uslovima predviđenim u tačkama 2. i 3. ovog člana, smatra se da je izmena prihvaćena:

a) ako nijedna strana ugovornica nije dostavila obaveštenje prema tački 2. pod b) ovog člana, po isteku šestomesečnog roka predviđenog u tački 2;

b) ako je makar jedna strana ugovornica uputila obaveštenje prema tački 2. pod b) ovog člana, onog datuma koji je bliži jednom od dva sledeća:

- datumu kada sve strane ugovornice koje su uputile takvo obaveštenje saopšte generalnom sekretaru da prihvataju predlog, s tim da se taj datum odloži do isteka šestomesečnog roka predviđenog u tački 2. ovog člana, ako su sva prihvatanja saopštena pre tog isteka;

- datumu isteka devetomesečnog roka o kome je reč u tački 3. ovog člana.

6. Svaka izmena koja se smatra prihvaćenom stupa na snagu šest meseci od dana kada se smatra prihvaćenom.

7. Generalni sekretar upućuje što je moguće pre svim stranama ugovornicama saopštenje da li je neka primedba stavljena na neki predlog izmena shodno tački 2. pod a) ovog člana i da li su mu jedna ili više strana ugovornica dostavile saopštenje u skladu sa tačkom 2. pod b) ovog člana. U slučaju da su jedna ili više strana ugovornica dostavile takvo saopštenje, on posle toga obaveštava sve strane ugovornice da li strana ili strane ugovornice koje su dostavile takvo saopštenje stavljaju primedbu na predlog izmene ili ga prihvataju.

8. Nezavisno od postupka u vezi sa izmenom, predviđenog u tačkama 1. do 6. ovog člana, prilozi i dodaci uz ovaj sporazum mogu se izmeniti na osnovu sporazuma između nadležnih organa svih strana ugovornica. Ako organ neke strane ugovornice izjavi da ga njeno nacionalno zakonodavstvo obavezuje da pre davanja svoje saglasnosti pribavi posebnu dozvolu ili odobrenje zakonodavnog tela, smatra se da je saglasnost te strane ugovornice za izmenu priloga data tek kad ta strana ugovornica izjavi generalnom sekretaru da je dobila traženu dozvolu ili odobrenje. Sporazumom između nadležnih organa može se predvideti da za vreme prelaznog perioda stari prilozi, potpuno ili delimično, ostanu na snazi uporedo sa novim prilozima. Generalni sekretar određuje dan stupanja na snagu novih tekstova nastalih kao rezultat takvih izmena.

Član 19.

Osim obaveštenja predviđenih u članovima 17. i 18. ovog sporazuma, generalni sekretar Organizacije ujedinjenih nacija obaveštava zemlje o kojima je reč u tački 1. člana 9. ovog sporazuma, kao i zemlje koje su postale strane ugovornice na osnovu tačke 2. člana 9. ovog sporazuma o:

a) potpisivanjima, ratifikovanju i pristupanju na osnovu člana 9,

b) datumima stupanja ovog sporazuma na snagu shodno članu 11,

v) otkazima na osnovu člana 12,

g) ukidanju ovog sporazuma shodno članu 13,

d) saopštenjima primljenim shodno članovima 10. i 14,

đ) izjavama i saopštenjima primljenim shodno tačkama 1. i 2. člana 16,

e) stupanju na snagu svake izmene shodno članu 18.

Član 20.

Posle 31. maja 1971. godine original ovog sporazuma se deponuje kod generalnog sekretara Organizacije ujedinjenih nacija, koji će overene kopije dostaviti svim državama o kojima je reč u tačkama 1. i 2. člana 9. ovog sporazuma.

U POTVRDU ČEGA SU, dole potpisani, propisno ovlašćeni u tom smislu, potpisali ovaj sporazum.

SAČINjENO prvog septembra hiljadu devet stotina sedamdesete godine u Ženevi, u po jednom primerku na engleskom, francuskom i ruskom jeziku, s tim što su sva tri teksta podjednako verodostojna.

Prilog br. 1

DEFINICIJE I NORME SPECIJALNIH SREDSTAVA[1] ZA PREVOZ LAKOKVARLjIVIH NAMIRNICA

1. **Izotermičko transportno sredstvo**. Transportno sredstvo čija je zatvorena komora[2] sastavljena od krutih* izolacionih zidova, uključujući vrata, pod i krov, koji omogućavaju da se ograniči razmena toplote između unutrašnjosti i spoljašnosti zatvorene komore, tako da se po ukupnom koeficijentu prenosa toplote (koeficijent *K*) transportno sredstvo može svrstati u jednu od dve sledeće kategorije:

I_N = Obično izotermičko transportno sredstvo – čija je karakteristika u tome što mu je koeficijent *K* jednak ili niži od 0,7 W/m^2°C;

I_R = Pojačano izotermičko transportno sredstvo – čija je karakteristika u tome što mu je koeficijent *K* jednak ili niži od 0,4 W/m^2°C, i čija najmanja debljina zida, ukoliko je transportno sredstvo šire od 2,5 m, iznosi 45 mm.

Definicija koeficijenta *K* i metode koji se primenjuje za njegovo merenje dati su u Dodatku br. 2 ovog priloga.

2. **Rashladno transportno sredstvo**. Izotermičko transportno sredstvo koje, pomoću nekog izvora hladnoće (vodeni led, sa dodatkom soli ili bez nje; eutektičke ploče; suvi led, sa regulacijom sublimiranja ili bez nje; tečni gas sa regulacijom isparavanja ili bez nje, itd.), osim mehaničkog ili „apsorpcionog" uređaja, omogućuje da se temperatura unutar prazne komore smanji i da se potom takva održi pri srednjoj spoljnoj temperaturi od +30 ˚C,

na najviše	+7 ˚C	za klasu A;
na najviše	−10 ˚C	za klasu B;
na najviše	−20 ˚C	za klasu C;
na najviše	0 ˚C	za klasu D.

Ukoliko takvo transportno sredstvo ima jedan ili više odeljaka, spremnika ili rezervoara, namenjenih rashladnom agensu, ti odeljci, spremnici ili rezervoari treba da:

- budu takvi da se mogu puniti ili dopunjavati sa spoljne strane transportnog sredstva,
- imaju kapacitet u skladu sa zahtevima tačke 3.1.3. Dodatka br. 2 Priloga br. 1.

Koeficijent *K* rashladnog transportnog sredstva klase B i C mora obavezno biti jednak ili manji od 0,4 W/m^2°C.

3. **Transportno sredstvo-hladnjača**. Izotermičko transportno sredstvo sa zasebnim ili za više transportnih sredstava zajedničkim rashladnim uređajem (mehanička kompresorska grupa, „apsorpciona" mašina, itd.) koji omogućava da se pri srednjoj spoljnoj temperaturi od +30 ˚C, temperatura T_i u unutrašnjosti prazne zatvorene komore spusti i da se zatim stalno održava na sledeći način:

Za klase A, B i C na svaku praktično stalnu željenu vrednost T_i, shodno dolenavedenim normama za tri klase:

Klasa A. Transportno sredstvo-hladnjača sa takvim rashladnim uređajem da T_i može da se izabere između +12 ˚C i 0 ˚C zaključno;

Klasa B. Transportno sredstvo-hladnjača sa takvim rashladnim uređajem da T_i može da se izabere između +12 ˚C i −10 ˚C zaključno;

Klasa C. Transportno sredstvo-hladnjača sa takvim rashladnim uređajem da T_i može da se izabere između +12 ˚C i −20 ˚C zaključno.

Za klase D, E i F na fiksnu praktično stalnu vrednost T_i shodno niže određenim normama za tri klase:

Klasa D. Transportno sredstvo-hladnjača sa takvim rashladnim uređajem da T_i bude jednako ili niže od 0 ˚C;

Klasa E. Transportno sredstvo-hladnjača sa takvim rashladnim uređajem da je T_i jednako ili niže od −10 ˚C;

Klasa F. Transportno sredstvo-hladnjača sa takvim rashladnim uređajem da je T_i jednako ili niže od −20 ˚C. Koeficijent K sredstava klasa B, C, E i F treba obavezno da bude jednak ili niži od 0,4 W/m^2°C.

4. **Transportno sredstvo za zagrevanje**. Izotermičko transportno sredstvo koje je sposobno da temperaturu unutar prazne zatvorene komore poveća i zatim stalno održava najmanje 12 časova bez dodatnog snabdevanja, na praktično stalnom nivou koji nije niži od +12 ˚C, pri sledećim srednjim spoljnim temperaturama:

- −10 ˚C u slučaju transportnog sredstva za zagrevanje klase A;
- −20 ˚C u slučaju transportnog sredstva za zagrevanje klase B;
- −30 ˚C u slučaju transportnog sredstva za zagrevanje klase C;
- −40 ˚C u slučaju transportnog sredstva za zagrevanje klase D.

Uređaj za proizvodnju toplote treba da ima snagu u skladu sa zahtevima tačaka 3.3.1. do 3.3.5. Dodatka br. 2 Priloga br. 1.

Koeficijent K sredstava klasa B, C i D treba obavezno da bude jednak ili niži od 0,4 W/m^2°C.

5. **Transportno sredstvo-hladnjača sa mogućnošću zagrevanja.** Izotermičko transportno sredstvo sa zasebnim ili za više transportnih sredstava zajedničkim rashladnim uređajem (mehanička kompresorska grupa, „apsorpciona" mašina, itd.) i za zagrevanje (koji poseduje električne grejače itd.) ili rashladno-grejne uređaje koji su sposobni da spuste temperaturu T_i unutar prazne komore i zatim je stalno održavaju, kao i da povećaju temperaturu i zatim je održavaju najmanje 12 časova bez dodatnog snabdevanja na praktično stalnom nivou, kao što je ispod naznačeno.

Klasa A: T_i može biti izabrana između +12 °C i 0 °C, uključujući i te temperature, pri srednjoj spoljnoj temperaturi između –10 °C i +30 °C.

Klasa B: T_i može biti izabrana između +12 °C i 0 °C, uključujući i te temperature, pri srednjoj spoljnoj temperaturi između –20 °C i +30 °C.

Klasa C: T_i može biti izabrana između +12 °C i 0 °C, uključujući i te temperature, pri srednjoj spoljnoj temperaturi između –30 °C i +30 °C.

Klasa D: T_i može biti izabrana između +12 °C i 0 °C, uključujući i te temperature, pri srednjoj spoljnoj temperaturi između –40 °C i +30 °C.

Klasa E: T_i može biti izabrana između +12 °C i –10 °C, uključujući i te temperature, pri srednjoj spoljnoj temperaturi između –10 °C i +30 °C.

Klasa F: T_i može biti izabrana između +12 °C i –10 °C, uključujući i te temperature, pri srednjoj spoljnoj temperaturi između –20 °C i +30 °C.

Klasa G: T_i može biti izabrana između +12 °C i –10 °C, uključujući i te temperature, pri srednjoj spoljnoj temperaturi između –30 °C i +30 °C.

Klasa H: T_i može biti izabrana između +12 °C i –10 °C, uključujući i te temperature, pri srednjoj spoljnoj temperaturi između –40 °C i +30 °C.

Klasa I: T_i može biti izabrana između +12 °C i –20 °C, uključujući i te temperature, pri srednjoj spoljnoj temperaturi između –10 °C i +30 °C.

Klasa J: T_i može biti izabrana između +12 °C i –20 °C, uključujući i te temperature, pri srednjoj spoljnoj temperaturi između –20 °C i +30 °C.

Klasa K: T_i može biti izabrana između +12 °C i –20 °C, uključujući i te temperature, pri srednjoj spoljnoj temperaturi između –30 °C i +30 °C.

Klasa L: T_i može biti izabrana između +12 °C i –20 °C, uključujući i te temperature, pri srednjoj spoljnoj temperaturi između –40 °C i +30 °C.

Koeficijent *K* sredstava klasa B, C, D, E, F, G, H, I, J, K i L treba obavezno da bude jednak ili niži od 0,4 W/m^2°C.

Uređaj za proizvodnju toplote ili rashladno-grejni uređaj u režimu grejanja treba da ima snagu u skladu sa zahtevima tačaka 3.4.1. do 3.4.5. Dodatka br. 2 Priloga br. 1.

6. Prelazne odredbe

6.1 Izotermičke komore sa deformabilnim zidovima koje su ušle u upotrebu pre nego što je stupila na snagu izmena tačke br. 1. Priloga br. 1 6. januara 2018. godine mogu da budu korišćene i dalje za prevoz lakokvarljivih namirnica prigodne klase do isteka sertifikata o saobraznosti. Važnost sertifikata se ne sme produžiti.

7. Definicije

Transportno sredstvo označava sklop delova koji čine izotermičku komoru i prateću konstrukciju potrebnu za drumski i železnički transport. Toplotni uređaji mogu biti deo sklopa.

Uređaj za zagrevanje je toplotni uređaj koji generiše toplotnu energiju za povećanje (zagrevanje) temperature unutar izotermičke komore.

Mehanički uređaj za zagrevanje i hlađenje predstavlja mehanički rashladni uređaj koji može da smanji (hlađenje) ili poveća (zagrevanje) temperaturu unutar transportnog sredstva, i koji je ispitan kako bi se utvrdio kapacitet hlađenja i zagrevanja.

Mehanički rashladni uređaj je toplotni uređaj koji generiše toplotnu energiju za smanjenje (hlađenje) temperature unutar transportnog sredstva mehaničkim pogonskim sistemom.

Rashladni uređaj je toplotni uređaj koji generiše toplotnu energiju za smanjenje (hlađenje) temperature unutar transportnog sredstva topljenjem, isparavanjem ili sublimacijom, na primer vodenog leda, slanog (eutektičkog) tečnog gasa ili suvog leda.

Toplotni uređaj je uređaj za generisanje toplotne energije za smanjenje (hlađenje) ili povećanje (zagrevanje) temperature unutar transportnog sredstva.

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[1] *Vagoni, kamioni, prikolice, kontejneri i druga slična transportna sredstva.*

[2] *Kad se radi o transportnom sredstvu-cisterni, izraz „komora" u ovoj definiciji označava samu cisternu.*

* *Krut se u ovom slučaju odnosi na nefleksibilnu kontinualnu ili nekontinualnu površinu, npr. celi čvrsti zidovi ili rolo-vrata.*

Prilog br. 1, Dodatak br. 1

ODREDBE O KONTROLI SAOBRAZNOSTI NORMAMA ZA IZOTERMIČKA, RASHLADNA, TRANSPORTNA SREDSTVA-HLADNjAČE, TRANSPORTNA SREDSTVA ZA ZAGREVANjE I TRANSPORTNA SREDSTVA-HLADNjAČE SA MOGUĆNOŠĆU ZAGREVANjA

1. Kontrola saobraznosti normama, propisanim u ovom prilogu, vrši se:

   a) pre puštanja transportnog sredstva u upotrebu,

   b) periodično – najmanje svake šeste godine, i

   v) svaki put kad to zatraži nadležni organ.

   Osim u slučajevima navedenim u odeljcima 5. i 6. Dodatka br. 2 ovog priloga, kontrolu treba obaviti u ispitnoj stanici koju je imenovao ili ovlastio nadležni organ zemlje u kojoj je transportno sredstvo upisano ili registrovano, osim ako je, u slučaju kontrole gorenavedene pod a), kontrola već izvršena na samom transportnom sredstvu ili njegovom prototipu u ispitnoj stanici koju je imenovao ili ovlastio nadležni organ zemlje u kojoj je transportno sredstvo proizvedeno.

2. Metode i postupci koje treba koristiti za kontrolu saobraznosti normama dati su u Dodatku br. 2 ovog priloga.

3. Sertifikat o saobraznosti normama izdaje nadležni organ zemlje u kojoj transportno sredstvo treba da bude registrovano ili upisano na formularu shodno obrascu navedenom u Dodatku br. 3 ovog priloga.

   Sertifikat mora biti uz transportno sredstvo za sve vreme transporta i pokazan na zahtev kontrolnog organa. Međutim, ako je na transportno sredstvo pričvršćena ATP sertifikaciona tablica, prikazana u Dodatku br. 3 ovog priloga, ona će se smatrati ekvivalentom sertifikata o saobraznosti. ATP sertifikaciona tablica sme biti pričvršćena samo kada za dato transportno sredstvo postoji važeći sertifikat o saobraznosti. ATP sertifikacione tablice se uklanjaju sa transportnog sredstva čim ona prestanu da zadovoljavaju norme navedene u ovom prilogu.

   Uz transportno sredstvo koje se isporučuje drugoj strani ugovornici potrebno je priložiti sledeće isprave kako bi nadležni organ države u kojoj transportno sredstvo treba da se registruje ili upiše mogao izdati sertifikat o saobraznosti:

   a) u svim slučajevima, izveštaj o ispitivanju izvršenom na datom transportnom sredstvu, odnosno na reprezentu tipa u slučaju serijske proizvodnje;

   b) u svim slučajevima, ATP sertifikat izdat od nadležnog organa zemlje u kojoj je transportno sredstvo proizvedeno, odnosno zemlje u kojoj je transportno sredstvo registrovano u slučaju transportnog sredstva u upotrebi. Ovakav sertifikat se smatra privremenim, sa rokom važnosti od najviše šest meseci. Za višetemperaturna transportna sredstva sa više odeljaka treba dostaviti i izjavu o saobraznosti (videti tačku 7.3.6. Dodatka br. 2 Priloga br. 1);

   v) u slučaju serijski proizvedenog transportnog sredstva, tehnički opis transportnog sredstva za koje je potrebno izdati sertifikat, a koji je izdao proizvođač transportnog sredstva ili njegov ovlašćeni predstavnik (ovaj opis treba da sadrži iste stavke koje sadrži i

odeljak izveštaja o ispitivanju koji se odnosi na opis transportnog sredstva i treba biti napisan na najmanje jednom od tri zvanična jezika). Za višetemperaturna transportna sredstva sa više odeljaka treba dostaviti i proračun (videti tačku 7.3.6. Dodatka br. 2 Priloga br. 1) zasnovan na iterativnoj metodi.

U slučaju kada se isporučuje upotrebljavano, transportno sredstvo se može podvrgnuti vizuelnoj proveri radi identifikacije pre nego što nadležni organ države u kojoj transportno sredstvo treba da bude registrovano ili upisano izda sertifikat o saobraznosti.

Za seriju identične serijski proizvedene izotermičke opreme (kontejnera) unutrašnje zapremine manje od 2 m^3, nadležni organ može izdati sertifikat o saobraznosti za seriju. U takvim slučajevima identifikacioni brojevi svake jedinice opreme, ili prvi i poslednji identifikacioni broj serije se naznačuju na sertifikatu o saobraznosti. U tom slučaju, na izotermička transportna sredstva navedena u tom sertifikatu moraju biti pričvršćene sertifikacione tablice opisane u Dodatku br. 3 pod B Priloga br. 1 izdate od strane nadležnog organa.

U slučaju kada se ova izotermička transportna sredstva (kontejneri) isporučuju drugoj strani ugovornici kako bi se tamo registrovala ili upisala, nadležni organ strane ugovornice u kojoj će vozilo biti registrovano ili upisano može izdati pojedinačni sertifikat o saobraznosti na osnovu originalnog sertifikata izdatog za čitavu seriju.

4. Oznake za raspoznavanje postavljaju se na transportno sredstvo shodno odredbama Dodatka br. 4 ovog priloga. One se uklanjaju čim transportno sredstvo prestane da bude saobrazno normama utvrđenim u ovom prilogu.

5. Izotermičke komore izotermičkih, rashladnih, transportnih sredstava-hladnjača, transportnih sredstava za zagrevanje i transportnih sredstava-hladnjača sa mogućnošću zagrevanja i njihovi rashladni, odnosno grejni uređaji moraju na sebi imati trajne proizvođačke tablice koje proizvođač pričvršćuje na vidljivom i lako dostupnom mestu na delu koji nije zamenljiv. Mora biti omogućena laka provera tablice bez upotrebe bilo kakvog alata. Kod izotermičkih komora tablica se mora nalaziti na spoljnoj strani komore. Proizvođačka tablica treba da jasno i neizbrisivo prikazuje makar sledeće pojedinosti:[3]

   Zemlju proizvodnje ili njenu slovnu oznaku koja se koristi u međunarodnom drumskom saobraćaju;

   Naziv proizvođača ili kompanije;

   Tip (brojčana ili slovna oznaka);

   Serijski broj;

   Mesec i godinu proizvodnje.

6. a) Novo serijski proizvedeno transportno sredstvo određenog tipa može biti odobreno ispitivanjem jednog uzorka tog tipa. Ukoliko ispitivano transportno sredstvo zadovolji zahteve predviđene za klasu kojoj pripada, rezultujući izveštaj o ispitivanju treba smatrati sertifikatom o odobrenju tipa. Rok važnosti takvog sertifikata je šest godina od dana završetka ispitivanja.

   Datum prestanka važnosti izveštaja o ispitivanju biće definisan mesecima i godinama.

b) Nadležni organ preduzima potrebne korake kako bi proverio saobraznost proizvodnje transportnih sredstava sa odobrenim reprezentom tipa. U tu svrhu se transportno sredstvo, slučajno izabrano iz proizvodne serije, može podvrgnuti ispitivanju.

v) Transportno sredstvo se ne može smatrati transportnim sredstvom istog tipa kao odobreno transportno sredstvo ukoliko ne zadovoljava sledeće minimalne zahteve:

(i) U slučaju izotermičkog transportnog sredstva, kada reprezent tipa može biti izotermičko, rashladno, transportno sredstvo-hladnjača, transportno sredstvo za zagrevanje ili transportno sredstvo-hladnjača sa mogućnošću zagrevanja,

konstrukcija treba da je uporediva i izolacioni materijal i metoda izolacije treba da budu identični;

debljina izolacionog materijala ne sme da bude manja od one kod reprezenta tipa;

unutrašnja oprema treba da bude identična ili jednostavnija;

broj vrata, poklopaca i drugih otvora treba da bude isti ili manji; i

unutrašnja površina komore ne sme da bude za više od 20% veća ili manja;

manje i ograničene izmene dodate ili zamenjene unutrašnje ili spoljašnje opreme mogu biti dopuštene:[4]

- ako je ekvivalentna zapremina akumuliranog izolacionog materijala za sve izmene manja od jedne stotine ukupne zapremine izolacionog materijala izotermičke komore;

- ako je koeficijent *K* ispitanog reprezenta tipa transportnog sredstva, korigovan proračunom dodatnih toplotnih gubitaka, manji ili jednak graničnom koeficijentu *K* za datu klasu transportnog sredstva; i

- ukoliko su izmene unutrašnje opreme izvedene koristeći istu tehniku, posebno u pogledu lepljene opreme.

Sve izmene treba da budu izvršene ili odobrene od strane proizvođača izotermičkog transportnog sredstva.

(ii) U slučaju rashladnog transportnog sredstva, kada reprezent tipa može biti rashladno transportno sredstvo,

zahtevi navedeni pod (i) treba da su zadovoljeni;

unutrašnji ventilatori za cirkulaciju vazduha treba da su uporedivi;

izvor hladnoće treba da je identičan; i

rezerva hladnoće po jedinici unutrašnje površine treba da je veća ili ista;

(iii) U slučaju transportnog sredstva-hladnjače, kada reprezent tipa može biti:

a) transportno sredstvo-hladnjača;

- zahtevi navedeni pod (i) treba da budu zadovoljeni; i

- efektivna rashladna snaga mehaničkog rashladnog uređaja po jedinici unutrašnje površine u istim temperaturnim uslovima treba da veća ili jednaka; ili

b) izotermičko transportno sredstvo, potpuno kompletirano, ali bez rashladnog uređaja, koji će se naknadno montirati.

Otvor na mestu nedostajućeg uređaja, za vreme određivanja koeficijenta *K*, treba popuniti oblogama iste debljine i izolacionih svojstava kao obloge koje se nalaze na prednjem zidu, pri čemu:

- zahtevi navedeni pod (i) treba da budu zadovoljeni; i

- efektivna rashladna snaga mehaničkog rashladnog uređaja ugrađenog u ovakav reprezent treba da odgovara tački 3.2.6. Dodatka br. 2 Priloga br. 1.

(iv) U slučaju transportnog sredstva za zagrevanje, kada reprezent tipa može biti izotermičko transportno sredstvo ili transportno sredstvo za zagrevanje,

- zahtevi navedeni pod (i) treba da budu zadovoljeni;

- izvor toplote treba da bude identičan; i

- snaga grejnog uređaja po jedinici unutrašnje površine treba da bude veća ili jednaka.

(v) U slučaju transportnog sredstva-hladnjače sa mogućnošću zagrevanja, kada reprezent tipa može biti:

a) transportno sredstvo-hladnjača sa mogućnošću zagrevanja,

- zahtevi navedeni pod (i) treba da budu zadovoljeni; i

- efektivna rashladna snaga mehaničkog rashladnog uređaja ili mehaničkog rashladno-grejnog uređaja po jedinici unutrašnje površine, pod istim temperaturnim uslovima, treba da bude veća ili jednaka;

- izvor toplote treba da bude identičan; i

- snaga grejnog uređaja po jedinici unutrašnje površine treba da bude veća ili jednaka; ili

b) izotermičko transportno sredstvo, potpuno kompletirano, ali bez mehaničkog rashladnog uređaja i uređaja za zagrevanje ili mehaničkog rashladno-grejnog uređaja, koji će se naknadno montirati.

Otvor na mestu nedostajućeg uređaja, za vreme određivanja koeficijenta *K*, treba popuniti oblogama iste debljine i izolacionih svojstava kao obloge koje se nalaze na prednjem zidu, pri čemu:

- zahtevi navedeni pod (i) treba da budu zadovoljeni; i

- efektivna rashladna snaga mehaničkog rashladnog ili rashladno-grejnog uređaja ugrađenog u ovakav reprezent treba odgovara tački 3.4.7. Dodatka br. 2 Priloga br. 1;

- izvor toplote treba da bude identičan; i

- snaga grejnih uređaja po jedinici unutrašnje površine treba da bude veća ili jednaka.

g) Ukoliko, u toku perioda od šest godina, proizvodna serija prevaziđe 100 transportnih sredstava, nadležni organ treba da utvrdi procenat transportnih sredstava koji će biti podvrgnut ispitivanju.

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3 Ovaj zahtev se odnosi samo na nove tablice. Dozvoljava se prelazni period od tri meseca od datuma stupanja na snagu ovog zahteva.

4 Sadašnje odredbe koje se tiču manjih i ograničenih izmena su primenjive na opremu proizvedenu posle datuma početka primene ove odredbe (30. septembar 2015.).

Prilog br. 1, Dodatak br. 2

METODE I POSTUPCI ZA MERENjE I KONTROLU IZOTERMIJE I EFIKASNOSTI RASHLADNIH ILI GREJNIH UREĐAJA SPECIJALNIH SREDSTAVA ZA PREVOZ LAKOVARLjIVIH NAMIRNICA

1. DEFINICIJE I OPŠTE ODREDBE

1.1 Koeficijent *K*. Ukupan koeficijent prenosa toplote (koeficijent *K*) transportnog sredstva određen je sledećom formulom:

$$K = \frac{W}{S \cdot \Delta T}$$

gde je *W* toplotna snaga koja je potrebna da se u komori srednje površine *S* održi, pri stalnom režimu, apsolutna razlika ΔT između srednje unutrašnje temperature T_i i srednje spoljne temperature T_e pri stalnoj srednjoj spoljnoj temperaturi T_e, za vreme ustaljenog režima, kada je srednja spoljna temperatura konstantna za komoru srednje površine *S*.

1.2 Srednja površina *S* komore je geometrijska sredina unutrašnje površine S_i i spoljne površine S_e komore.

$$S = \sqrt{S_i \cdot S_e}$$

Prilikom određivanja dve površine S_i i S_e uzimaju se u obzir osobenosti konstrukcije komore i nepravilnosti površine, kao što su zaobljenost, lukovi točkova, itd. i upisuju se u odgovarajuću rubriku predviđenog izveštaja o ispitivanju; međutim, ako je zatvorena komora obložena talasastim limom, u obzir se uzima ravna površina koju zauzima lim, a ne njegova razvijena površina.

Za izračunavanje srednje vrednosti površine izotermičke komore vana, ispitna stanica određena od strane nadležnog organa treba da odabere jednu od tri metode ispitivanja:

Metoda A. Proizvođač treba da obezbedi crteže i proračun unutrašnjih i spoljnih površina.

Površine S_e i S_i se određuju uzimajući u obzir projektovane površine specifičnih konstrukcija nepravilnosti površine, kao što su krive, talasi, lukovi točkova itd.

Metoda B. Proizvođač treba da obezbedi crteže i ispitna stanica određena od strane nadležnog organa treba da koristi proračune na osnovu šema[5] i formula navedenih ispod:

$$S_i = (((WI \times LI) + (HI \times LI) + (HI \times WI)) \times 2)$$
$$S_e = (((WE \times LE) + (HE \times LE) + (HE \times WE)) \times 2)$$

gde je:

WI - *Y*-osa unutrašnje površine
LI - *X*-osa unutrašnje površine
HI - *Z*-osa unutrašnje površine
WE - *Y*-osa spoljne površine
LE - *X*-osa spoljne površine
HE - *Z*-osa spoljne površine

Koristeći najprigodniju formulu za *Y*-osu unutrašnje površine

$$WI = (WIa \times a + WIb \times (b + c/2) + WIc \times c/2) / (a + b + c)$$
$$WI = (WIa \times a/2 + WIb \times (a/2 + b/2) + WIc \times b/2) / (a + b)$$
$$WI = (WIa \times a + WIb \times b + (WIb + WIc)/2 \times c) / (a + b + c)$$

gde je:
WIa - unutrašnja širina poda ili rastojanje između lukova točkova
WIb - unutrašnja širina na visini vertikalne ivice od poda ili iznad lukova točkova
WIc - unutrašnja širina krova
a - visina vertikalne ivice od poda
b - ili visina između donjeg dela vertikalne ivice i krova ili između gornje površine luka točka i gornjeg dela vertikalne ivice od poda
c - visina između krova i tačke b

Zajedno sa dve formule za *X* i *Z* ose unutrašnje površine:

$$LI = ((LIa \times a) + (LIb + LIc)/2 \times b + (LIc \times c)) / (a + b + c)$$

gde je:
LIa - unutrašnja dužina poda
LIb - unutrašnja dužina iznad lukova točkova
LIc - unutrašnja dužina krova
a - visina između *LIa* i *LIb*
b - visina između *LIb* i *LIc*
c - visina između *LIc* i krova

$$WI = (WI_{nazad} + WI_{napred})/2$$

gde je:
WI_{nazad} - širina na pregradi
WI_{napred} - širina na kraju vrata

Spoljašnja površina se računa koristeći formule navedene ispod

$$WE = WI + \text{deklarisana srednja vrednost debljine} \times 2$$
$$LE = LI + \text{deklarisana srednja vrednost debljine} \times 2$$
$$HE = HI + \text{deklarisana srednja vrednost debljine} \times 2$$

Metoda V. Ukoliko ekspertima nije zadovoljavajuća nijedna navedena metoda, unutrašnju površinu treba izmeriti u skladu sa dijagramima i formulama datim u metodi B.

Vrednost koeficijenta *K* treba da se računa na osnovu unutrašnje površine, uzimajući za vrednost debljine izolacionog materijala vrednost nula. Iz ove vrednosti koeficijenta *K*, računa se srednja vrednost debljine izolacionog materijala pod pretpostavkom da λ za izolacioni materijal ima vrednost 0,025 W/m°C.

$$d = Si \times \Delta T \times \lambda / W$$

Kada se proceni debljina izolacije, izračunava se spoljašnja površina i srednja površina. Konačna vrednost koeficijenta *K* se izračunava putem naredne iteracije.

Tačke na kojima se mere temperature

1.3 U slučaju komore oblika paralelopipeda, srednja unutrašnja temperatura komore (T_i) je aritmetička sredina temperatura merenih na odstojanju 10 cm od zidova na 12 sledećih tačaka:

a) na 8 unutrašnjih temena komore; i

b) u središtu 4 najveće unutrašnje površine komore.

Ako komora nema oblik paralelopipeda, tih 12 mernih tačaka raspoređuju se što je moguće bolje, vodeći računa o njenom obliku.

1.4 U slučaju komore oblika paralelopipeda, srednja spoljna temperatura komore (T_e) je aritmetička sredina temperatura merenih na odstojanju 10 cm od zidova na sledećih 12 tačaka:

a) na 8 spoljnih temena komore; i

b) u središtu 4 najveće spoljne površine komore.

Ako komora nema oblik paralelopipeda, tih 12 mernih tačaka raspoređuju se što je moguće bolje, vodeći računa o njenom obliku.

1.5 Srednja temperatura zidova komore je aritmetička sredina srednje spoljne i srednje unutrašnje temperature komore:

$$\frac{T_e + T_i}{2}$$

1.6 Instrumenti za merenje temperature, zaštićeni od zračenja, treba da budu postavljeni unutar i sa spoljne strane komore na tačkama definisanim u tačkama 1.3. i 1.4. ovog priloga.

Period stalnog režima i trajanje testa

1.7 Kolebanje srednje spoljne i srednje unutrašnje temperature komore, u toku najmanje 12-točasovnog perioda stalnog režima ne treba da prelazi ± 0,3 °C, odnosno ± 1,0 °C u toku prethodnog 6-točasovnog perioda.

Razlika između grejne ili rashladne snage merene u toku dva perioda ne kraćih od 3 časa na početku i na kraju stalnog režima, a odvojenih najmanje 6 časova, mora biti manja od 3%.

Za proračun koeficijenta *K* koristiće se srednje vrednosti temperatura i grejne ili rashladne snage u toku najmanje 6 poslednjih časova stalnog režima.

Srednje unutrašnje i spoljne temperature na početku i na kraju računskog perioda od najmanje 6 časova ne treba da se razlikuju za više od 0,2 °C.

2. IZOTERMIJA TRANSPORTNOG SREDSTVA

Postupci merenja koeficijenta *K*

2.1 Transportna sredstva osim cisterni namenjenih za prevoz tečnih namirnica

2.1.1 Merenje koeficijenta *K* vrši se pri stalnom režimu bilo metodom unutrašnjeg hlađenja, bilo putem metoda unutrašnjeg zagrevanja. U oba slučaja se u ispitnu komoru stavlja potpuno prazno transportno sredstvo.

Metoda ispitivanja

2.1.2 Kada se koristi metoda unutrašnjeg hlađenja, jedan ili više razmenjivača toplote se postavlja u unutrašnjost ispitne komore. Površina tih razmenjivača treba da bude takva da omogući da se, ako kroz njih prolazi fluid temperature ne niže od 0 ˚C[6], srednja unutrašnja temperatura komore održava ispod + 10 ˚C u stalnom režimu. Kod metode unutrašnjeg zagrevanja koriste se električni grejni uređaji (otporni, itd.). Razmenjivači toplote ili električni grejni uređaji treba da budu opremljeni ventilatorima čija je propusna moć dovoljna da obezbedi 40 do 70 izmena vazduha na čas pri praznoj zapremini ispitivane komore, a da raspodela vazduha po unutrašnjoj površini ispitivane komore bude takva da obezbedi da maksimalna razlika između temperatura u bilo koje 2 od 12 tačaka naznačenih u tački 1.3. ovog dodatka ne pređe 2 °C u stalnom režimu.

2.1.3 Količina toplote: Toplotni fluks koji se rasipa otpornim električnim grejnim uređajem sa ventilatorom ne treba da pređe vrednost od 1 W/cm^2, a grejna tela treba da budu zaštićena kućištem niske vrednosti emisivnosti.

Potrošnja električne energije treba da bude određena sa tačnošću od ±0,5%.

Postupak ispitivanja

2.1.4 Bez obzira na to koja se metoda koristi, u ispitnoj komori za sve vreme trajanja ispitivanja, srednja temperatura treba da bude ujednačena i stalna u skladu sa tačkom 1.7. ovog dodatka, na takvom nivou da razlika temperature između unutrašnjosti transportnog sredstva i ispitne komore bude 25 ˚C ± 2 ˚C, a da se srednja temperatura zidova komore transportnog sredstva održava na +20 ˚C ± 0,5 ˚C.

2.1.5 Za vreme ispitivanja, kako metodom unutrašnjeg hlađenja, tako i metodom unutrašnjeg zagrevanja, treba obezbediti neprekidnu cirkulaciju vazduha u ispitnoj komori i to tako da brzina strujanja vazduha na odstojanju od 10 cm od zidova komore transportnog sredstva iznosi između 1 i 2 m/s.

2.1.6 U pogon se stavljaju uređaji za stvaranje i raspoređivanje hladnoće ili toplote, uređaji za merenje razmenjene rashladne ili grejne snage i kaloričnog ekvivalenta ventilatora. Gubici u električnom kablu između instrumenta za merenje uvedene toplote i ispitivane komore se određuju merenjem ili proračunom i oduzimaju od ukupno izmerene toplote.

2.1.7 Pri stalnom režimu, maksimalna razlika između temperatura na najtoplijoj i najhladnijoj tački izvan komore transportnog sredstva ne sme preći 2 °C.

2.1.8 Srednja spoljna i srednja unutrašnja temperatura komore transportnog sredstva treba da se meri najmanje svakih 5 minuta.

2.2 Transportna sredstva-cisterne namenjena za prevoz tečnih namirnica

2.2.1 Niže izneta metoda primenjuje se samo na transportna sredstva-cisterne sa jednim ili više odeljaka, koja su namenjena jedino za prevoz tečnih namirnica, kao što je, na primer, mleko. Svaki odeljak tih cisterni ima najmanje jedan revizioni otvor i jedan priključak za pražnjenje; ako postoji više odeljaka, oni su međusobno odvojeni neizolovanim vertikalnim pregradama.

2.2.2 Merenje se vrši pri stalnom režimu metodom unutrašnjeg zagrevanja cisterne koja se, bez ikakvog tereta, stavlja u ispitnu komoru.

Metoda ispitivanja

2.2.3 Jedan električni razmenjivač toplote stavlja se unutar cisterne. Ako cisterna ima više odeljaka, u svaki odeljak se stavlja po jedan električni razmenjivač. Ti razmenjivači treba da budu opremljeni ventilatorima čija je propusna moć dovoljna da obezbedi da razlika između maksimalne i minimalne temperature unutar svakog odeljka ne prelazi 3 °C pri stalnom režimu. Ako cisterna ima više odeljaka, razlika između srednje temperature merene u najhladnijem odeljku i srednje temperature merene u najtoplijem odeljku ne treba da iznosi više od 2 °C, s tim da se merenje temperature vrši na način koji je označen u tački 2.2.4. ovog dodatka.

2.2.4 Uređaji za merenje temperature, zaštićeni od zračenja, smeštaju se unutar i izvan cisterne na odstojanju od 10 cm od zidova na sledeći način:

a) ako cisterna ima samo jedan odeljak, merenje treba obaviti na najmanje sledećih 12 tačaka:

- 4 krajnje tačke dva prečnika pod pravim uglom, jedan horizontalan, a drugi vertikalan, u blizini svakog od dva danca,

- 4 krajnje tačke dva prečnika, s nagibom od 45˚ nad horizontalom, u aksijalnoj ravni cisterne;

b) Ako cisterna ima dva odeljka, merenje treba obaviti najmanje na sledećim tačkama:

- u blizini danca prvog odeljka i pregrade između odeljaka, na krajnjim tačkama tri poluprečnika koji formiraju uglove od 120º, pri čemu je jedan poluprečnik usmeren vertikalno nagore,

- u blizini danca drugog odeljka i pregrade između odeljaka, na krajnjim tačkama tri poluprečnika koji formiraju uglove od 120º, pri čemu je jedan poluprečnik usmeren vertikalno nadole;

v) Ako cisterna ima više odeljaka, raspodela je sledeća:

za svaki od dva krajnja odeljka, najmanje sledeće:

- krajnje tačke horizontalnog prečnika u blizini danca i krajnje tačke vertikalnog prečnika u blizini pregrade;

a za svaki drugi odeljak najmanje:

- krajnje tačke prečnika sa nagibom od 45˚ nad horizontalom u blizini jedne od pregrada i krajnje tačke prečnika koji u odnosu na prethodni stoji upravno u blizini druge pregrade.

g) Srednja unutrašnja i srednja spoljna temperatura cisterne predstavljaju aritmetičku sredinu svih merenja izvršenih unutar, odnosno spolja. Za cisterne sa dva ili više odeljaka, srednja unutrašnja temperatura svakog odeljka predstavlja aritmetičku sredinu ne manje od četiri merenja koja se odnose na dati odeljak, pri čemu ukupni broj merenja u svim odeljcima ne sme biti manji od dvanaest.

Postupak ispitivanja

2.2.5 Tokom ispitivanja, u ispitnoj komori za sve vreme trajanja ispitivanja, srednja temperatura treba da bude ujednačena i stalna u skladu sa tačkom 1.7. ovog dodatka, na takvom nivou da razlika temperature između unutrašnjosti cisterne i ispitne komore bude 25 ˚C ± 2 ˚C, a da se srednja temperatura zidova cisterne održava na +20 ˚C ± 0,5 ˚C.

2.2.6 Treba obezbediti neprekidnu cirkulaciju vazduha u ispitnoj komori i to tako da brzina strujanja vazduha na odstojanju od 10 cm od zidova cisterne iznosi između 1 i 2 m/s.

2.2.7 U pogon se stavljaju uređaji za stvaranje toplote i cirkulaciju vazduha, uređaji za merenje razmenjene grejne snage i kaloričnog ekvivalenta ventilatora.

2.2.8 Pri stalnom režimu, maksimalna razlika između temperatura na najtoplijoj i najhladnijoj tački izvan komore cisterne ne sme preći 2 °C.

2.2.9 Srednja spoljna i srednja unutrašnja temperatura komore transportnog sredstva treba da se meri najmanje svakih 5 minuta.

2.3 Zajedničke odredbe za sve tipove izotermičkih transportnih sredstava

2.3.1 Provera koeficijenta *K*

Kada cilj ispitivanja nije određivanje koeficijenta *K* već samo provera da li je taj koeficijent ispod izvesne granice, ispitivanja izvršena u uslovima koji su izneti u tačkama 2.1.1. do 2.2.9. ovog dodatka, mogu da se obustave u momentu kada izvršena merenja pokažu da koeficijent *K* odgovara postavljenim uslovima.

2.3.2 Tačnost merenja koeficijenta *K*

Ispitne stanice treba da budu snabdevene potrebnom opremom i instrumentima kako bi koeficijent *K* bio određen proširenom mernom nesigurnošću od ± 10% kada se koristi metod unutrašnjeg hlađenja, odnosno ± 5% kada se koristi metoda unutrašnjeg zagrevanja. Tokom proračuna proširene merne nesigurnosti nivo poverenja mora biti najmanje 95%.

3. EFEKTIVNOST TOPLOTNIH UREĐAJA TRANSPORTNIH SREDSTAVA

Postupci određivanja efikasnosti toplotnih uređaja transportnih sredstava

3.1 Rashladna transportna sredstva

3.1.1 Prazno transportno sredstvo stavlja se u ispitnu komoru čija se srednja temperatura održava ujednačenom i stalnom na +30 ˚C, sa odstupanjem ±0,5 ˚C. Vazduh u ispitnoj komori treba da cirkuliše na način opisan u tački 2.1.5. ovog dodatka.

3.1.2 Uređaji za merenje temperature, zaštićeni od zračenja, stavljaju se unutar i izvan komore transportnog sredstva na mestima označenim u tačkama 1.3. i 1.4. ovog dodatka.

Postupak ispitivanja

3.1.3 a) Za **transportna sredstva, osim transportnih sredstava sa fiksnim eutektičkim pločama, i transportnih sredstava opremljenih sistemima sa tečnim gasom** maksimalna masa rashlađivača koju je označio proizvođač ili koja se može normalno rasporediti, stavlja se na predviđena mesta kada srednja unutrašnja temperatura komore dostigne srednju spoljnu temperaturu komore (+30 ˚C). Vrata, kapci i drugi otvori se zatvaraju, a uređaji za unutrašnje provetravanje transportnog sredstva (ako ih ima) stavljaju se u pogon do svog maksimalnog opterećenja. Pored toga, u slučaju novog transportnog sredstva, kada se postigne temperatura predviđena za datu klasu transportnog sredstva, u komori transportnog sredstva se pušta u rad grejni uređaj čija snaga iznosi 35% od toplote koja se pri stalnom režimu razmenjuje kroz zidove. Za vreme ispitivanja nije dopušteno dodatno snabdevanje rashlađivačem.

b) Za **transportna sredstva sa fiksnim eutektičkim pločama**, ispitivanju prethodi faza zaleđivanja eutektičkog rastvora. U tom cilju, kada srednja unutrašnja temperatura komore transportnog sredstva i temperatura ploča dostignu srednju spoljnu temperaturu (+30 ˚C), vrata i otvori se zatvaraju i pušta se u rad rashladni uređaj ploča u toku perioda od 18 uzastopnih časova. Ako rashladni uređaj ploča ima ciklični mehanizam rada, ukupno vreme rada uređaja biće 24 časa. Ako je transportno sredstvo novo, posle prestanka rada rashladnih uređaja, a kada je postignuta temperatura predviđena za tu klasu transportnog sredstva, u komori transportnog sredstva se pušta u rad grejni uređaj snage 35% od toplote razmenjene kroz zidove pri stalnom režimu. Za vreme ispitivanja ne vrši se ponovo zaleđivanje rastvora.

v) Za **transportna sredstva opremljena sistemima sa tečnim gasom** koristi se sledeći postupak ispitivanja: kada srednja unutrašnja temperatura komore transportnog sredstva dostigne srednju spoljnu temperaturu (+30 ˚C), spremnici za tečni gas se pune do nivoa propisanog od strane proizvođača. Vrata, kapci i drugi otvori se zatvaraju kao u normalnom radu, a uređaji za unutrašnje provetravanje (ukoliko postoje) se stavljaju u pogon do svog najvećeg opterećenja. Termostat treba podesiti na temperaturu za ne više od 2 °C nižu od granične temperature za klasu kojoj transportno sredstvo pripada. Tada se započinje sa hlađenjem. Za vreme hlađenja komore transportnog sredstva potrebno je menjati utrošeno rashladno sredstvo. Zamena se vrši posle kraćeg od dva perioda:

- period od početka hlađenja do trenutka u kojem je po prvi put dostignuta temperatura propisana za klasu za koju se smatra da joj transportno sredstvo pripada

- period od tri sata od početka hlađenja.

Po isteku tog perioda ne treba dodavati rashladno sredstvo za vreme ispitivanja.

U slučaju novog transportnog sredstva, u trenutku kada se dostigne temperatura propisana za klasu za koju se smatra do joj transportno sredstvo pripada, unutar komore transportnog sredstva se stavlja u rad grejni uređaj snage jednake 35% od razmenjene toplote kroz zidove u stalnom režimu.

Zajedničke odredbe za sve tipove rashladnih transportnih sredstava

3.1.4 Merenje srednje spoljne i srednje unutrašnje temperature komore transportnog sredstva vrši se najmanje svakih 5 minuta.

3.1.5 Ispitivanje se obavlja u toku 12 časova od trenutka kada srednja unutrašnja temperatura komore transportnog sredstva dostigne donju granicu propisanu za klasu za koju se smatra da joj pripada transportno sredstvo (A = +7 ˚C; B = –10 ˚C; C = –20 ˚C; D =0 ˚C) ili, za transportna sredstva sa eutektičkim fiksnim pločama, pošto rashladni uređaj prestane sa radom.

Kriterijum zadovoljenja

3.1.6 Ispitivanje će biti zadovoljavajuće ako tokom gorenavedenog perioda od 12 časova srednja unutrašnja temperatura komore transportnog sredstva ne pređe gorenavedenu donju granicu.

3.1.7 Ukoliko je rashladni uređaj iz tačke 3.1.3. (v) sa svim pomoćnim uređajima ispitan samostalno, uz zadovoljenje kriterijuma, od strane nadležnog organa u skladu sa delom 9 ovog dodatka u cilju određivanja njegove efektivne rashladne snage na datim referentnim temperaturama, transportno sredstvo može da se prihvati kao rashladno transportno sredstvo bez ispitivanja efektivnosti ukoliko je efektivna rashladna snaga uređaja u stalnom radu veća od toplotnih gubitaka kroz zidove za datu klasu, pomnoženih faktorom 1,75.

3.1.8 Ukoliko se rashladni uređaj menja uređajem drugog tipa, nadležni organ može da:

a) zahteva da se transportno sredstvo podvrgne merenjima i proverama predviđenim u tačkama 3.1.3. do 3.1.5; ili

b) se uveri da je korisna rashladna snaga novog uređaja, na temperaturi predviđenoj za tu klasu transportnih sredstava, ista ili veća od snage zamenjenog uređaja; ili

v) se uveri da korisna rashladna snaga novog uređaja zadovoljava odredbe tačke 3.1.7.

3.1.9 Rashladni uređaj sa tečnim gasom se smatra uređajem istog tipa kao ispitan ukoliko:

a) se koristi isti rashlađivač;

b) isparivač ima istu snagu;

v) sistem za regulaciju ima iste karakteristike;

g) rezervoar tečnog gasa je projektovan na isti način i njegova zapremina je veća ili jednaka onoj navedenoj u izveštaju sa ispitivanja.

Prečnici i tehnologija dovodnih cevi su identični.

3.2 Transportna sredstva-hladnjače

Metoda ispitivanja

3.2.1 Ispitivanje će se vršiti pod uslovima opisanim u tačkama 3.1.1. i 3.1.2. ovog dodatka.

Postupak ispitivanja

3.2.2 Kada srednja unutrašnja temperatura komore dostigne spoljnu temperaturu (+30 ˚C), vrata, kapci i razni otvori se zatvaraju i rashladni uređaj kao i uređaji za unutrašnje provetravanje (ako postoje), stavljaju se u pogon do njihovog najvećeg opterećenja. Osim toga, za nova transportna sredstva, u trenutku kada se dostigne temperatura propisana za klasu za koju se smatra do joj transportno sredstvo pripada, unutar komore transportnog sredstva se stavlja u rad grejni uređaj snage jednake 35% od razmenjene toplote kroz zidove u stalnom režimu.

3.2.3 Srednja spoljna i srednja unutrašnja temperatura komore transportnog sredstva mere se najmanje svakih 5 minuta.

3.2.4 Ispitivanje se nastavlja tokom 12 časova od trenutka kada srednja unutrašnja temperatura komore transportnog sredstva dostigne:

- bilo donju granicu propisanu za klasu kojoj, kako se pretpostavlja, pripada transportno sredstvo ako se radi o klasama A, B ili C (A = 0 ˚C; B = –10 ˚C; C = –20 ˚C); ili

- bilo vrednost ne nižu od gornje granice propisane za klasu kojoj, kako se pretpostavlja, pripada transportno sredstvo ako se radi o klasama D, E ili F (D = 0 ˚C; E = –10 ˚C; F = –20 ˚C).

Kriterijum zadovoljenja

3.2.5 Ispitivanje će biti zadovoljavajuće ako je rashladni uređaj u stanju da održi za vreme ovih 12 časova režim predviđene temperature, pri čemu se ne uzimaju u obzir periodi automatskog odmrzavanja rashladnog uređaja.

3.2.6 Ako je rashladni uređaj, sa svim pomoćnim uređajima ispitan samostalno, uz zadovoljenje kriterijuma, od strane nadležnog organa u cilju određivanja njegove efektivne rashladne snage na datim referentnim temperaturama, transportno sredstvo se može prihvatiti kao transportno sredstvo-hladnjača bez ispitivanja efektivnosti ukoliko je efektivna rashladna snaga uređaja u stalnom radu veća od toplotnih gubitaka kroz zidove za datu klasu, pomnoženih faktorom 1,75.

3.2.7 Ako se rashladni uređaj zameni uređajem drugog tipa, nadležni organ može:

a) da zahteva da se transportno sredstvo podvrgne merenjima i proverama predviđenim u tačkama 3.2.1. do 3.2.4; ili

b) da se uveri da je korisna rashladna snaga novog uređaja, na temperaturi predviđenoj za tu klasu transportnih sredstava, ista ili veća od snage zamenjenog uređaja; ili

v) da se uveri da korisna rashladna snaga novog uređaja zadovoljava odredbe tačke 3.2.6.

3.3 Transportna sredstva za zagrevanje

Metoda ispitivanja

3.3.1 Prazno transportno sredstvo stavlja se u ispitnu komoru čija se temperatura ujednačeno i stalno održava na što je moguće nižem nivou. Vazduh u ispitnoj komori treba da cirkuliše na način opisan u tački 2.1.5. ovog dodatka.

3.3.2 Uređaji za merenje temperature, zaštićeni od zračenja, stavljaju se unutar i izvan komore transportnog sredstva na mestima označenim u tačkama 1.3. i 1.4. ovog dodatka.

Postupak ispitivanja

3.3.3 Vrata, kapci i razni otvori se zatvaraju, a grejni uređaj, kao i uređaji za unutrašnje provetravanje (ukoliko postoje), stavljaju se u pogon do njihovog najvećeg opterećenja.

3.3.4 Srednja spoljna i srednja unutrašnja temperatura komore transportnog sredstva mere se najmanje svakih 5 minuta.

3.3.5 Ispitivanje se nastavlja u toku 12 časova od trenutka kada razlika između srednje unutrašnje temperature komore transportnog sredstva i srednje spoljne temperature dostigne vrednost koja odgovara uslovima propisanim za klasu kojoj, kako se pretpostavlja, pripada transportno sredstvo pri čemu se ta temperaturna razlika za nova transportna sredstva povećava za 35%.

Kriterijum zadovoljenja

3.3.6 Ispitivanje je zadovoljavajuće ako je grejni uređaj u stanju da u toku tih 12 časova održi propisanu razliku u temperaturi.

3.4 Transportna sredstva-hladnjače sa mogućnošću zagrevanja

Metoda ispitivanja

3.4.1 Ispitivanje se sprovodi u dve faze. Efektivnost rashladnog uređaja koji je deo rashladno-grejnog uređaja se određuje u prvoj, a grejnog uređaja u drugoj fazi.

3.4.2 U prvoj fazi, ispitivanje se sprovodi pod uslovima opisanim u tačkama 3.1.1. i 3.1.2. ovog dodatka; U drugoj fazi, sprovodi se pod uslovima opisanim u tačkama 3.3.1. i 3.3.2. ovog dodatka.

Postupak ispitivanja

3.4.3 (a) Uopšten postupak za merenje efektivne rashladne snage mehaničkih rashladnih uređaja naveden u tačkama 4.1. i 4.2. se primenjuje tako da može da se koristi na grejnim uređajima koristeći kalorimetrijsku kutiju.

Temperatura na uvodnom otvoru za vazduh termičkih uređaja ili isparivača u kalorimetrijskoj kutiji treba da bude +12 °C.

Za merenje efektivne grejne snage klasa A, E i I, izvodi se jedno ispitivanje pri srednjoj spoljnoj temperaturi (T_e) od -10 °C.

Za merenje efektivne grejne snage klasa B, F i J, izvode se dva ispitivanja pri srednjoj spoljnoj temperaturi (T_e) od -10 °C i -20 °C.

Za merenje efektivne grejne snage klasa C, D, G, H, K ili L izvode se tri ispitivanja. Jedno se izvodi na srednjoj spoljnoj temperaturi (T_e) od -10 °C, drugo na minimalnoj spoljnoj temperaturi zahtevanoj za tu klasu i jedno na spoljnoj temperaturi čija je vrednost između dve prethodno navedene temperature, kako bi bila moguća interpolacija za efektivnu grejnu snagu na temperaturama za ostale klase između njih.

Za potpuno električne grejne sisteme najmanje jedno ispitivanje se izvodi za merenje efektivne grejne snage klasa A, B, C, D, E, F, G, H, I, J, K ili L. Ovo ispitivanje se izvodi na +12 °C na uvodnom otvoru za vazduh isparivača i minimalnoj spoljnoj temperaturi zahtevanoj za tu klasu.

(i) Ukoliko se merenje efektivne grejne snage izvodi na najmanjoj spoljnoj temperaturi zahtevanoj za tu klasu, ne zahtevaju se dodatna ispitivanja.

(ii) Ukoliko se merenje efektivne grejne snage ne izvodi na najmanjoj spoljnoj temperaturi zahtevanoj za tu klasu, dodatno ispitivanje funkcionalnosti grejnog uređaja treba da se izvede. Ovo ispitivanje funkcionalnosti se sprovodi na najmanjoj temperaturi zahtevanoj za tu klasu (npr. -40 °C za klasu L) da bi se potvrdilo da grejni uređaj i njegov pogonski sistem (npr. generator kojeg pokreće dizel motor) započinju rad ispravno funkcionišu na najnižoj temperaturi.

(b) Kada se merenje vrši na transportnom sredstvu, osnovni zahtevi za postupak ispitivanja za prvu fazu opisani su u tačkama 3.2.2. i 3.2.3. ovog dodatka; za drugu fazu su opisani u tačkama 3.3.3. i 3.3.4. ovog dodatka.

3.4.4 Druga faza ovog ispitivanja može da se započne odmah nakon završetka prve faze, bez uklanjanja merne opreme.

3.4.5 U svakoj fazi, ispitivanje se nastavlja 12 sati nakon što:

a) u prvoj fazi, srednja unutrašnja temperatura komore dostigne nižu granicu za klasu kojoj bi trebalo da pripadne;

b) u drugoj fazi, razlika između srednje unutrašnje temperature komore i srednje spoljne temperature komore dostigne vrednost koja odgovara uslovima propisanim za klasu kojoj, kako se pretpostavlja, pripada transportno sredstvo pri čemu se ta temperaturna razlika za nova transportna sredstva povećava za 35%.

Kriterijum zadovoljenja

3.4.6 Rezultati ispitivanja se smatraju zadovoljavajućim ukoliko je:

a) u prvoj fazi, rashladni ili rashladno-grejni uređaj sposoban da održi propisane temperaturne uslove tokom pomenutog dvanaestočasovnog perioda, bez uračunatog bilo kakvog automatskog odmrzavanja rashladnog ili rashladno-grejnog uređaja;

b) u drugoj fazi, grejni uređaj sposoban da održi zadatu razliku temperature tokom pomenutog dvanaestočasovnog perioda.

3.4.7 Ukoliko se rashladna jedinica rashladnog ili rashladno-grejnog uređaja, sa svim pomoćnim uređajima ispitan samostalno, uz zadovoljenje kriterijuma, od strane nadležnog organa u cilju određivanja njegove efektivne rashladne snage na datim referentnim temperaturama, može se prihvatiti da je transportno sredstvo prošlo prvu fazu ispitivanja bez ispitivanja efektivnosti ukoliko je efektivna rashladna snaga uređaja u stalnom radu veća od toplotnih gubitaka kroz zidove za datu klasu, pomnoženih faktorom 1,75.

3.4.8 Ukoliko se mehanički rashladni uređaj rashladnog ili rashladno-grejnog uređaja menja uređajem drugog tipa, nadležni organ može da:

a) zahteva da se transportno sredstvo podvrgne merenjima i proverama za prvu fazu ispitivanja predviđenim u tačkama 3.4.1. do 3.4.5. ovog dodatka; ili

b) se uveri da je korisna rashladna snaga novog uređaja, na temperaturi predviđenoj za tu klasu transportnih sredstava, ista ili veća od snage zamenjenog uređaja; ili

v) se uveri da efektivna rashladna snaga novog mehaničkog rashladnog uređaja zadovoljava odredbe tačke 3.4.7. ovog dodatka.

4. POSTUPAK ZA MERENjE EFEKTIVNE RASHLADNE SNAGE W_o UREĐAJA KADA U ISPARIVAČU NEMA SMRZAVANjA

4.1 Opšti principi

4.1.1 Kada se odnosi na kalorimetrijsku kutiju ili izotermičku komoru transportnog sredstva u neprekidnom radu, ova snaga se izražava formulom:

$$W_o = W_j + U \cdot \Delta T$$

gde je U gubitak toplote kalorimetrijske kutije ili izotermičke komore transportnog sredstva izražen u W/˚C.

ΔT je razlika između srednje unutrašnje temperature T_i i srednje spoljne temperature T_e kalorimetra ili izolovane komore transportnog sredstva (°C),

W_j je odavana toplota koju utroši grejni uređaj sa ventilatorom kako bi održao sve temperaturne razlike u ravnoteži.

4.2 Metoda ispitivanja

4.2.1 Rashladni uređaj se smešta u kalorimetrijsku kutiju ili izotermičku komoru transportnog sredstva.

U oba slučaja, toplotni gubici se mere preko srednje temperature zida pre merenja snage. Za vreme određivanja efektivne rashladne snage uvodi se aritmetički korekcioni faktor, baziran na iskustvu ispitne stanice, koji uzima u obzir prosečnu temperaturu zidova pri svakoj termičkoj ravnoteži.

Poželjno je koristiti kalibrisanu kalorimetrijsku kutiju kako bi se obezbedila maksimalna tačnost.

Postupak merenja je opisan gore u tačkama 1.1. do 2.1.8; međutim, dovoljno je meriti samo gubitak toplote *U*, čija je vrednost definisana sledećim izrazom:

$$U = \frac{W}{\Delta T_m}$$

gde je:

W – grejna snaga (merena u W) odavana unutrašnjim grejačem i ventilatorima;

ΔT_m – razlika između srednje unutrašnje temperature T_i i srednje spoljne temperature T_e;

U predstavlja protok toplote po stepenu razlike između temperature vazduha unutar i izvan kalorimetrijske kutije ili transportnog sredstva mereno sa ugrađenim rashladnim uređajem.

Kalorimetrijska kutija ili transportno sredstvo se smešta u ispitnu komoru. Ako se koristi kalorimetrijska kutija, $U \cdot \Delta T$ ne treba da bude veće od 35% od efektivne rashladne snage W_o.

Kalorimetrijska kutija ili izotermička komora transportnog sredstva treba da budu najmanje obično izolovani.

4.2.2 Merna oprema

Ispitne stanice treba da budu opremljene mernom opremom koja obezbeđuje merenje vrednosti *U* sa tačnošću od ±5%. Gubici toplote kroz curenja vazduha usled nezaptivenosti ne treba da pređu 5% od ukupnog prenosa toplote kroz kalorometrijsku kutiju ili kroz izotermičku komoru transportnog sredstva. Rashladna snaga treba da bude određena sa tačnošću od ± 5%.

Merna oprema kalorimetrijske kutije ili transportnog sredstva treba da odgovara tačkama 1.3. i 1.4. ovog dodatka. Potrebno je merenje sledećih veličina:

a) *Temperature vazduha:* Najmanje četiri termometra ravnomerno raspoređenih na uvodnom otvoru isparivača;

Najmanje četiri termometra ravnomerno raspoređenih na ispusnim otvorima iz isparivača;

Najmanje četiri termometra ravnomerno raspoređenih na uvodnom otvoru (uvodnim otvorima) rashladnog uređaja;

Termometri treba da budu zaštićeni od zračenja.

Tačnost sistema za merenje temperature treba da bude ± 0,2 °C ;

b) *Potrošnja energije*: Potrebno je obezbediti opremu za merenje potrošnje električne energije ili goriva rashladnog uređaja.

Potrošnju električne energije i goriva potrebno je odrediti sa tačnošću od ± 0,5%;

v) *Brzina obrtanja*: Potrebno je obezbediti opremu za merenje brzine obrtanja kompresora i ventilatora ili način da se brzina obrtanja proračuna ukoliko je samo merenje nepraktično.

Brzinu obrtanja potrebno je odrediti sa tačnošću od ± 1%;

g) *Pritisak*: Davače pritiska visoke preciznosti (tačnosti do ± 1%) potrebno je postaviti na hladnjak i isparivač i na uvodni otvor kompresora ako je isparivač opremljen sa regulatorom pritiska.

4.2.3 Uslovi ispitivanja

a) Prosečna temperatura vazduha na uvodnom otvoru (uvodnim otvorima) u sklop rashladnog uređaja treba da bude održavana na 30 ˚C ± 0,5 ˚C.

Maksimalna razlika između temperatura na najtoplijoj i najhladnijoj tački ne treba da pređe 2 °C.

b) Unutar kalorimetrijske kutije ili izotermičke komore transportnog sredstva (na uvodnom otvoru u isparivač): treba da postoje tri nivoa temperatura između −25 ˚C i +12 ˚C zavisno od karakteristike uređaja, od kojih jedan nivo temperature treba da bude na najmanjoj propisanoj temperaturi za klasu koju zahteva proizvođač sa dozvoljenim odstupanjem od ±1 °C.

Srednja unutrašnja temperatura treba da bude održavana sa odstupanjem od ±0,5 °C. Za vreme merenja rashladne snage, toplotni gubici u kalorimetrijskoj kutiji ili izotermičkoj komori transportnog sredstva biće održavani na stalnom nivou sa odstupanjem od ±1%.

Kada predaje rashladni uređaj na ispitivanje, proizvođač treba da priloži:

- Dokumentaciju koja opisuje ispitivani uređaj;

- Tehnički dokument koji sadrži parametre koji su najvažniji za funkcionisanje uređaja i koji definiše njihove dozvoljene opsege;

- Karakteristike serije ispitivanog uređaja; i

- Izjavu o tome koje će se pogonsko sredstvo (pogonska sredstva) koristiti za vreme ispitivanja.

4.3 Postupak ispitivanja

4.3.1 Ispitivanje se sastoji iz dve glavne faze - faze hlađenja i faze merenja efektivne rashladne snage na tri rastuća temperaturna nivoa.

a) Faza hlađenja - početna temperatura kalorimetrijske kutije ili transportnog sredstva treba da iznosi 30 °C ± 3 °C. Ona se potom smanjuje do sledećih vrednosti: −25 °C za klasu −20 °C, −13 °C za klasu −10 °C ili −2 °C za klasu 0 °C;

b) Merenje efektivne rashladne snage na svakom nivou unutrašnje temperature.

Prvo ispitivanje se obavlja u trajanju od najmanje četiri časa za svaki temperaturni nivo, uz korišćenje termostata (u sklopu rashladnog uređaja) da bi se stabilizovao prenos toplote između unutrašnjosti i spoljašnosti kalorimetrijske kutije ili transportnog sredstva.

Drugo ispitivanje obavlja se bez korišćenja termostata u cilju određivanja maksimalne rashladne snage, sa grejnom snagom unutrašnjeg grejača koja obezbeđuje uslove ravnoteže pri svakom nivou temperature, kao što je propisano u tački 4.2.3.

Drugo ispitivanje se izvodi u trajanju od najmanje četiri časa.

Pre prelaska sa jednog na drugi temperaturni nivo, kalorimetrijsku kutiju ili uređaj je potrebo ručno odmrznuti.

Ukoliko rashladni uređaj može biti pogonjen sa više oblika energije, potrebno je obaviti ispitivanje sa svakim od tih oblika.

Ako je kompresor pogonjen motorom vozila, ispitivanje se obavlja na minimalnom i na nominalnom broju obrtaja kompresora koje je propisao proizvođač.

Ako je kompresor pogonjen kretanjem vozila, ispitivanje se obavlja na nominalnom broju obrtaja kompresora koji je propisao proizvođač.

4.3.2 Isti postupak se primenjuje i kod dole opisane metode razlike entalpija, sa tom specifičnošću što je potrebno meriti rasipanje toplotne snage na ventilatorima isparivača pri svakom temperaturnom nivou.

Ta metoda se može, alternativno, koristiti i za ispitivanje reprezenta tipa. U tom slučaju efektivna rashladna snaga se dobija množenjem masenog protoka (m) rashladne tečnosti sa razlikom entalpije rashladne pare na izlazu iz uređaja (h_o) i entalpije tečnosti na uvodnom otvoru uređaja (h_i).

Da bi se dobila efektivna rashladna snaga, potrebno je oduzeti toplotu koju generišu ventilatori isparivača (W_f). Merenje W_f je otežano u slučaju kad su ventilatori isparivača pogonjeni spoljnim motorom i u tom slučaju korišćenje metode entalpije nije preporučljivo. Ako su ventilatori pogonjeni unutrašnjim električnim motorima, električna snaga se meri odgovarajućim instrumentima sa tačnošću od ±3%, uz merenje protoka rashlađivača sa tačnošću od ±3%.

Toplotni bilans dat je izrazom:

$$W_o = (h_o - h_i)m - W_f.$$

Električni grejač se postavlja unutar transportnog sredstva kako bi se postigla termička ravnoteža.

4.3.3 Mere predostrožnosti

Pošto se ispitivanja efektivne rashladne snage obavljaju sa isključenim termostatom rashladnog uređaja, treba preduzeti sledeće mere predostrožnosti:

Potrebno je isključiti sistem za ubrizgavanje toplog gasa, ukoliko ga transportno sredstvo poseduje;

Ukoliko postoji automatska kontrola koja isključuje pojedinačne cilindre (radi podešavanja snage u zavisnosti od izlazne snage motora) ispitivanje je potrebno obaviti sa brojem cilindara koji odgovara datoj temperaturi.

4.3.4 Provere

Potrebno je proveriti sledeće stavke i u izveštaju o ispitivanju navesti korišćene metode:

a) sistem za odmrzavanje i termostat ispravno funkcionišu;

b) brzina strujanja vazduha treba da se izmeri koristeći postojeći standard;

Ako se meri cirkulacija vazduha ventilatora isparivača rashladnog uređaja, koristiće se metode koje omogućavaju merenje ukupne izlazne zapremine. Preporučuje se korišćenje jednog od relevantnih standarda, na primer ISO 5801:2017 i AMCA 210-16.

v) pri ispitivanju se koristi rashladno sredstvo koje je odredio proizvođač.

4.4 Rezultat ispitivanja

4.4.1 Rashladna snaga prema zahtevima ATP-a je ona koja odgovara srednjoj temperaturi na ulaznom otvoru (ulaznim otvorima) isparivača. Instrumenti za merenje temperature treba da budu zaštićeni od zračenja.

4.5 Postupak ispitivanja mehaničkog rashladnog uređaja ukoliko je izvršena zamena rashladnog sredstva

4.5.1 Opšti principi

Ispitivanje se vrši u skladu sa postupkom opisanim u poglavlju 4, tačkama 4.1. do 4.4. i na osnovu kompletnog ispitivanja rashladnog uređaja sa jednim rashladnim sredstvom – referentnim.

Rashladni uređaj, njegovo rashladno kolo i komponente rashladnog kola ne treba da budu drugačiji kada se koristi drugo rashladno sredstvo. Samo vrlo ograničene promene su dozvoljene i to:

a) Promena i zamena ekspanzionog uređaja (tip, podešavanje);

b) Promena maziva;

v) Promena zaptivki.

Zamensko rashladno sredstvo mora imati slične termo-fizičke i hemijske osobine kao i referentno rashladno sredstvo i treba da rezultuje sličnim ponašanjem u rashladnom kolu, posebno u pogledu rashladnih snaga.

4.5.2 Postupak ispitivanja

Zbog sličnog ponašanja zamenskog i referentnog rashladnog sredstva, neophodan broj ispitivanja za odobrenje tipa može biti smanjen. Kada je reč o rashladnoj snazi, zamenska rashladna sredstva moraju biti u skladu sa kriterijumom ekvivalentnosti koji dozvoljava najviše 10% nižu rashladnu snagu za zamensko rashladno sredstvo u poređenju sa odobrenim referentnim rashladnim sredstvom.

Kriterijum ekvivalentnosti je definisan formulom:

$$\frac{Q_{зам} - Q_{реф}}{Q_{реф}} \geq -0{,}1 \quad (1)$$

gde:

Q_{ref} predstavlja rashladnu snagu uređaja ispitanog sa referentnim rashladnim sredstvom,

Q_{zam} predstavlja rashladnu snagu uređaja ispitanog sa zamenskim rashladnim sredstvom.

Broj ispitivanja i ocena zamenskog rashladnog sredstva se zasniva na razlikama u rezultatima ispitivanja u poređenju sa referentnim rashladnim sredstvom. Treba izvršiti po najmanje jedno ispitivanje na najnižoj i najvišoj temperaturi za datu temperaturnu klasu, u režimu rada sa najvećom rashladnom snagom.

U slučaju da je u pitanju dijapazon rashladnih uređaja, program ispitivanja može da se redukuje u skladu sa tačkom 4.5.3.

U zavisnosti od rezultata ovih ispitivanja, dalja merenja mogu biti neophodna. Razlikuju se sledeći slučajevi:

i) **Striktna ekvivalentnost** je slučaj kada je razlika između rashladnih snaga prilikom korišćenja zamenskog rashladnog sredstva za ne više od 10% manja na svim temperaturama ispitivanja date klase u poređenju sa referentnim rashladnim sredstvom. U slučaju da je rashladna snaga viša ili do 5% manja, rashladna snaga ostvarena pomoću referentnog rashladnog sredstva može biti zadržana u izveštaju o ispitivanju za uređaj sa zamenskim rashladnim sredstvom. U slučaju da je rashladna snaga manja za više od 5%, rashladna snaga ostvarena pomoću zamenskog rashladnog sredstva može da se izračuna na osnovu rezultata ispitivanja.

ii) **Restriktivna ekvivalentnost** je slučaj kada je na najmanje jednoj temperaturi ispitivanja za datu klasu razlika između rashladnih snaga prilikom korišćenja zamenskog rashladnog sredstva za ne više od 10% manja u poređenju sa referentnim rashladnim sredstvom. U ovom slučaju dalje merenje se obavlja na među-temperaturama, kao što je saopšteno od strane proizvođača, što je neophodno da bi se potvrdila tendencija odstupanja rashladnih snaga na različitim temperaturama i proračunala rashladna snaga uređaja sa zamenskim rashladnim sredstvom na osnovu rezultata ispitivanja.

Ukoliko potrošnja snage rashladnog uređaja ispitanog sa zamenskim rashladnim sredstvom odstupa od rezultata dobijenih sa referentnim rashladnim sredstvom, podaci o

potrošnji snage treba da se prilagode izmerenim vrednostima koristeći proračun, za slučajeve striktne i restriktivne ekvivalentnosti.

4.5.3 Postupak ispitivanja za dijapazon rashladnih uređaja

Dijapazon rashladnih uređaja opisuje dijapazon modela specifičnog tipa rashladnih uređaja različitih veličina i snaga ali sa istim podešavanjem rashladnog kola i istim tipom komponenti rashladnog kola.

U slučaju dijapazona rashladnih uređaja, dalja redukcija ispitivanja je moguća.

Ukoliko su najmanje dva rashladna uređaja iz dijapazona, uključujući i uređaje sa najmanjom i najvećom rashladnom snagom, ispitana sa zamenskim rashladnim sredstvom i odobrena na osnovu ispitivanja u skladu sa postupkom opisanim u 4.5.2 tako da su ostvareni rezultati ekvivalentni rezultatima postignutim sa odobrenim referentnim rashladnim sredstvom, izveštaj o ispitivanju za ostale uređaje ovog dijapazona rashladnih uređaja može da se izradi proračunom rashladnih snaga na osnovu izveštaja o ispitivanju rashladnih uređaja sa referentnim rashladnim sredstvom i na osnovu ovog ograničenog broja ispitivanja sa zamenskim rashladnim sredstvom.

Usaglašenost ispitanih rashladnih uređaja i svakog drugog rashladnog uređaja koji pripada istom dijapazonu rashladnih uređaja treba da bude potvrđena od strane proizvođača. Dodatno, nadležni organ treba da preduzme odgovarajuće mere da potvrdi da je svaki uređaj usaglašen sa navedenim dijapazonom rashladnih uređaja.

4.5.4 Izveštaj o ispitivanju

Dopuna koja sadrži rezultate ispitivanja sa zamenskim rashladnim sredstvom i odobrenim referentnim rashladnim sredstvom treba da bude dodata izveštaju o ispitivanju za rashladni uređaj sa referentnim rashladnim sredstvom. Sve izmene rashladnog uređaja u skladu sa 4.5.1 treba da budu sadržane u ovoj dopuni.

U slučaju da su rashladne snage, potencijalno i potrošnja energije, rashladnog uređaja sa zamenskim rashladnim sredstvom dobijene proračunom, postupak proračuna treba da bude sadržan u ovoj dopuni.

5. PROVERA IZOTERMIJE TRANSPORTNOG SREDSTVA U UPOTREBI

U svrhu provere izotermije svakog pojedinačnog transportnog sredstva u upotrebi, kao što je propisano u tački 1. pod b) i v) Dodatka br. 1 ovog priloga, nadležni organ može:

Primeniti metode opisane u tačkama 2.1.1. do 2.3.2. ovog dodatka; ili

Odrediti stručnjake čiji je zadatak da procene podesnost transportnog sredstva da se zadrži u datoj klasi. Ti stručnjaci treba da uzmu u obzir dolenavedene pojedinosti i zasnuju svoje zaključke na informacijama kao što je dole naznačeno.

5.1 Opšti pregled transportnog sredstva

Pregled treba da ima formu inspekcije transportnog sredstva u cilju utvrđivanja sledećih stavki:

a) postojanja trajne proizvođačke tablice koju postavlja proizvođač;

b) opšte konstrukcije izolacione obloge;

v) metode postavljanja izolacije;

g) prirode i stanja zidova;

d) stanja izolovanog odeljka;

đ) debljine zidova;

i vršenja svih potrebnih osmatranja vezanih za izotermiju transportnog sredstva. Da bi se to obavilo, stručnjaci mogu zatražiti da se deo transportnog sredstva demontira i zahtevati da im se na uvid stavi sva dokumentacija koja im je potrebna (crteži, izveštaji o ispitivanju, specifikacije, fakture, itd.).

5.2 Pregled zaptivenosti vazduha (nije primenljivo na cisterne)

Ovaj pregled obavlja pregledač smešten u transportno sredstvo, koje se nalazi u jako osvetljenom prostoru. Može se, takođe, koristiti bilo koja druga metoda koja obezbeđuje tačnije rezultate.

5.3 Odluke

a) Ako su zaključci u pogledu opšteg stanja komore povoljni, transportno sredstvo se može zadržati u upotrebi kao izotermičko transportno sredstvo njegove početne klase za dalji period ne duži od tri godine. Ako zaključci stručnjaka nisu prihvatljivi, transportno sredstvo se može zadržati u upotrebi samo nakon zadovoljavajućeg merenja koeficijenta *K* shodno postupku opisanom u tačkama 2.1.1. do 2.3.2. ovog dodatka; tada može biti zadržano u upotrebi u toku narednih šest godina.

b) U slučaju pojačanog izotermičkog transportnog sredstva, ako zaključci stručnjaka pokazuju da nije pogodno za zadržavanje u upotrebi u njegovoj početnoj klasi, ali jeste pogodno za upotrebu kao obično izotermičko transportno sredstvo, onda se komora može zadržati u upotrebi u odgovarajućoj klasi u toku naredne tri godine. U tom slučaju postojeće oznake za raspoznavanje (prikazane u Dodatku br. 4 ovog priloga) biće zamenjene odgovarajućim.

v) U slučaju serijski proizvedenih transportnih sredstava određenog tipa koji zadovoljavaju zahteve tačke 6. Dodatka br. 1 ovog priloga i pripadaju jednom vlasniku, pored pregleda svakog pojedinačnog transportnog sredstva, koeficijent *K* može biti meren na ne manje od 1% broja razmatranih transportnih sredstava, u skladu sa odredbama tačaka 2.1, 2.2. i 2.3. ovog dodatka. Ako su rezultati provere i merenja prihvatljivi, sva razmatrana transportna sredstva mogu biti zadržana u upotrebi kao izotermička transportna sredstva njihove početne klase u toku narednih šest godina.

6. PROVERA EFEKTIVNOSTI TOPLOTNIH UREĐAJA TRANSPORTNIH SREDSTAVA U UPOTREBI

U pogledu provere efektivnosti toplotnog uređaja svakog rashladnog transportnog sredstva, transportnog sredstva-hladnjače, transportnog sredstva za zagrevanje ili transportnog

sredstva-hladnjače sa mogućnošću zagrevanja u upotrebi, propisane u tački 1. pod b) i v) Dodatka br. 1 ovog priloga, nadležni organ može:

- bilo primeniti metode opisane u tačkama 3.1, 3.2, 3.3. i 3.4. ovog dodatka;

- bilo ovlastiti stručnjake da primenjuju metode opisane u tačkama 5.1. i 5.2. ovog dodatka, kada je primenjivo, kao i sledeće odredbe.

6.1 Rashladna transportna sredstva osim transportnih sredstava sa fiksnim eutektičkim akumulatorima

Proveriće se da li unutrašnja temperatura praznog transportnog sredstva, koja je prethodno dovedena do spoljne temperature, može da se dovede na graničnu temperaturu za klasu transportnog sredstva propisanu u ovom prilogu i da se održava ispod ove temperature, u trajanju *t* kada je

$$t \geq \frac{12 \cdot \Delta T}{\Delta T'},$$

pri čemu je

ΔT razlika između +30 ˚C i ove granične temperature, i

$\Delta T'$ razlika između srednje spoljne temperature za vreme ispitivanja i spomenute granične temperature, pod uslovom da spoljna temperatura nije manja od +15 ˚C.

Ako su rezultati povoljni, transportna sredstva se mogu zadržati u upotrebi kao rashladna u svojoj prvobitnoj klasi, za novi period u trajanju od najviše 3 godine.

6.2 Transportna sredstva-hladnjače

6.2.1 Nezavisno transportno sredstvo

(i) Transportno sredstvo konstruisano počevši od 2. januara 2012.

Proverava se da li, kada spoljna temperatura nije niža od +15 ˚C, unutrašnja temperatura praznog transportnog sredstva može biti dovedena na temperaturu klase u okviru maksimalnog perioda (u minutima), kao što je propisano u donjoj tabeli:

Spoljna temperatura	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	˚C
Klasa C,F	360	350	340	330	320	310	300	290	280	270	260	250	240	230	220	210	min
Klasa B,E	270	262	253	245	236	228	219	211	202	194	185	177	168	160	151	143	min
Klasa A,D	180	173	166	159	152	145	138	131	124	117	110	103	96	89	82	75	min

Unutrašnja temperatura praznog transportnog sredstva mora prethodno biti dovedena na spoljnu temperaturu.

Ako su rezultati povoljni, transportno sredstvo se može zadržati u upotrebi kao transportno sredstvo-hladnjača u svojoj prvobitnoj klasi, za novi period u trajanju od najviše 3 godine.

(ii) Prelazne odredbe koje se primenjuju na transportna sredstva u upotrebi

Za transportna sredstva konstruisana pre datuma definisanog u tački 6.2. pod (i) primenjuju se sledeće odredbe:

Proverava se da li se unutrašnja temperatura praznog transportnog sredstva, prethodno dovedena na spoljašnju temperaturu ne manju od + 15 ˚C, može dovesti, za najviše 6 časova:

- za klase A, B ili C, do minimalne temperature klase transportnog sredstva propisane u ovom prilogu;

- za klase D, E ili F, do granične temperature klase transportnog sredstva propisane u ovom prilogu.

Ako su rezultati povoljni, transportno sredstvo se može zadržati u upotrebi kao transportno sredstvo-hladnjača u svojoj prvobitnoj klasi, za novi period u trajanju od najviše 3 godine.

(iii) Transportno sredstvo sa više odeljaka

Ispitivanje opisano u (i) treba da se izvodi simultano za sve odeljke. Tokom ispitivanja, ukoliko su pregrade pomerljive, one treba da budu na takvom mestu da zapremine odeljaka odgovaraju maksimalnoj potrebnoj rashladnoj snazi.

Merenja treba vršiti sve dok najviša temperatura izmerena od strane dva davača postavljena unutar svakog odeljka ne dostigne temperaturu za odgovarajuću klasu.

Za transportno sredstvo sa više odeljaka kod koga temperature u odeljcima mogu da se podešavaju, treba sprovesti dodatno ispitivanje reverzibilnosti:

Temperature odeljaka treba birati tako da susedni odeljci tokom ispitivanja imaju najveću moguću temperaturnu razliku. Određeni odeljci treba da se dovedu na temperaturu klase (–20 °C) dok ostali treba da budu na 0 °C. Kada se navedene temperature dostignu, temperaturna podešavanja treba izmeniti za svaki odeljak, tako da oni odeljci koji su bili na 0 °C sada budu na –20 °C, a oni koji su bili na –20 °C budu na 0 °C.

Potrebno je potvrditi da odeljci koji su podešeni na 0 °C imaju ispravnu regulaciju temperature na 0 °C ± 3 °C tokom najmanje 10 minuta, dok su ostali na –20 °C. Potom treba da se zamene podešene temperature u odeljcima i da se sprovede isto potvrđivanje.

U slučaju da transportno sredstvo ima funkciju zagrevanja, ispitivanje treba da započne nakon ispitivanja efektivnosti kada je temperatura podešena na –20 °C. Bez otvaranja vrata, odeljke čija je temperatura bila podešena na 0 °C je potrebno zagrejati, dok se ostali odeljci održavaju na temperaturi od –20 °C. Kada se ispuni kriterijum provere, podešavanja odeljaka se menjaju. Ne postoji vremensko ograničenje za izvršenje navedenih ispitivanja.

U slučaju da transportno sredstvo nema funkciju grejanja, treba da bude dozvoljeno da vrata budu otvorena kako bi se ubrzalo povećanje temperature u predmetnim odeljcima.

Transportno sredstvo se smatra usaglašenim ako:

a) Je, za svaki odeljak, temperatura klase dostignuta u vremenskom ograničenju prikazanom u tabeli u (i). Kako bi se definisalo vremensko ograničenje, najniža (najhladnija) srednja spoljna temperatura se bira iz dva skupa merenja pomoću dva spoljna davača; i

b) Su dodatna ispitivanja navedena u (iii), kada su neophodna, zadovoljavajuća.

6.2.2 Zavisno transportno sredstvo

(i) Zavisno transportno sredstvo, čiji se rashladni uređaj pogoni motorom vozila

Treba potvrditi da, kada spoljna temperatura nije ispod 15 °C, unutrašnja temperatura praznog transportnog sredstva može biti održavana na temperaturi klase, nakon hlađenja i ustaljivanja, kada je motor uključen na broju obrtaja praznog hoda koji je podešen od strane proizvođača (gde je primenjivo), najmanje jedan sat i trideset minuta.

Ukoliko su rezultati zadovoljavajući, transportno sredstvo može biti zadržano u upotrebi kao transportno sredstvo-hladnjača u svojoj prvobitnoj klasi, za novi period u trajanju od najviše 3 godine.

(ii) Prelazne odredbe za zavisno transportno sredstvo u upotrebi:

Za transportna sredstva konstruisano pre 6. januara 2018. ne primenjuje se ova odredba. U ovom slučaju, transportno sredstvo treba da bude usklađeno sa zahtevima (i) i (ii) ove tačke primenljivim za datum konstruisanja transportnog sredstva.

6.2.3 Po zahtevu proizvođača, zamena originalnog rashladnog sredstva mehaničkog rashladnog uređaja u upotrebi je dopuštena za rashladna sredstva prikazana u tabeli ispod i pod sledećim uslovima:

Originalno rashladno sredstvo	Zamensko rashladno sredstvo
R404A	R452A

a) izveštaj o ispitivanju ili dopuna izveštaja o ispitivanju koja potvrđuje ekvivalentnost sličnom mehaničkom rashladnom uređaju sa zamenskim rashladnim sredstvom su dostupni; i

b) ispitivanje efektivnosti na osnovu 6.2.1 je uspešno izvršeno.

Proizvođačka tablica rashladnog uređaja treba da bude izmenjena ili zamenjena kako bi se naznačilo zamensko rashladno sredstvo i potrebna količina.

Originalni broj izveštaja o ispitivanju treba biti zadržan na ATP sertifikatu o usaglašenosti uz poziv na izveštaj o ispitivanju ili dopunu izveštaja o ispitivanju na osnovu kojih je izvršena zamena rashladnog sredstva.

6.3 Transportna sredstva za zagrevanje

Proverava se da li razlika između unutrašnje temperature transportnog sredstva i spoljne temperature merodavne za klasu kojoj transportno sredstvo pripada, predviđena u ovom prilogu (22 °C za klasu A, 32 °C za klasu B, 42 °C za klasu C i 52 °C za klasu D) može biti dostignuta i održana najmanje 12 časova. Ako su rezultati povoljni, transportna sredstva se mogu zadržati u radu kao transportna sredstva za zagrevanje, u svojoj prvobitnoj klasi, za novi period u trajanju od najviše 3 godine.

6.4 Transportna sredstva-hladnjače sa mogućnošću zagrevanja

Provera se vrši u dve faze.

(i) Tokom prve faze treba da bude potvrđeno da, kada spoljna temperatura nije manja od +15 °C, unutrašnja temperatura praznog transportnog sredstva može biti dovedena na temperaturu klase u dozvoljenom periodu (u minutima), kao što je prikazano u tabeli u tački 6.2. ovog dodatka.

Unutrašnja temperatura praznog transportnog sredstva treba da prethodno bude dovedena na spoljnu temperaturu.

(ii) U drugoj fazi, treba da bude potvrđeno da razlika između unutrašnje temperature transportnog sredstva i spoljne temperature koja odgovara klasi kojoj transportno sredstvo pripada kao što je opisano u ovom Prilogu (razlika od 22 °C u slučaju klasa A, E i I, 32 °C u slučaju klasa B, F i J, 42 °C u slučaju klasa C, G i K, i 52 °C u slučaju klasa D, H i L), može biti dostignuta i održavana najmanje 12 časova.

Ukoliko su rezultati zadovoljavajući, transportno sredstvo može da ostane u upotrebi kao transportno sredstvo-hladnjača sa mogućnošću zagrevanja u prvobitnoj klasi, za novi period u trajanju od najviše 3 godine.

6.5 Tačke na kojima se meri temperatura

Tačke na kojima se meri temperatura, zaštićene od zračenja, nalaze se unutar i sa spoljne strane komore transportnog sredstva.

Merenje unutrašnje temperature komore transportnog sredstva (T_i) se obavlja u najmanje 2 tačke koje se nalaze unutar komore transportnog sredstva na rastojanju od najviše 50 cm od prednjeg zida, 50 cm od zadnjih vrata na visini od najmanje 15 cm i najviše 20 cm iznad površine poda.
Merenje spoljne temperature komore transportnog sredstva (T_e) se obavlja u najmanje 2 tačke koje se nalaze:

(i) Jedna merna tačka vertikalno u krugu od 20 cm oko srednje visine izotermičke komore, na udaljenosti od 10 do 20 cm od bočnog zida, i

(ii) Druga merna tačka na 20 do 50 cm od uvodnog otvora u kondenzator.

Kao konačno se uzima očitavanje u najtoplijoj unutrašnjoj tački. Spoljna temperatura koja se koristi za određivanje maksimalnog dozvoljenog vremena trajanja procesa hlađenja, u slučaju transportnog sredstva proizvedenog 2. januara 2012. godine ili kasnije je srednja temperatura svih očitavanja sa spoljašnjih tačaka dok se ne postigne temperatura za odgovarajuću klasu.

6.6 Zajedničke odredbe za rashladna transportna sredstva, transportna sredstva-hladnjače i transportna sredstva za zagrevanje

(i) Ako su rezultati neprihvatljivi, rashladna transportna sredstva, transportna sredstva-hladnjače, transportna sredstva za zagrevanje i transportna sredstva-hladnjače sa mogućnošću zagrevanja mogu se zadržati u upotrebi u svojoj prvobitnoj klasi samo ako u ispitnim stanicama uspešno prođu ispitivanja opisana u tačkama 3.1, 3.2, 3.3

i 3.4 ovog dodatka; Ona se tada mogu zadržati u upotrebi u svojoj prvobitnoj klasi za novi period od 6 godina.

(iii) U slučaju serijski proizvedenih rashladnih transportnih sredstava, transportnih sredstava-hladnjača, transportnih sredstava za zagrevanje i transportnih sredstava-hladnjača sa mogućnošću zagrevanja određenog tipa koji zadovoljavaju zahteve tačke 6. Dodatka br. 1 ovog priloga i pripadaju istom vlasniku, pored pregleda toplotnih uređaja, u cilju da se utvrdi da li je njihovo opšte stanje zadovoljavajuće, određivanje efektivnosti rashladnog ili grejnog uređaja može da se izvrši u ispitnoj stanici prema odredbama tačaka 3.1, 3.2, 3.3. i 3.4. ovog dodatka na najmanje 1% od broja ovih transportnih sredstava. Ako su rezultati provere i merenja prihvatljivi, sva razmatrana transportna sredstva mogu biti zadržana u upotrebi kao transportna sredstva njihove početne klase u toku narednih šest godina.

7. POSTUPAK ZA MERENjE SNAGE VIŠETEMPERATURNIH MEHANIČKIH RASHLADNIH UREĐAJA I DIMENZIONISANjE TRANSPORTNIH SREDSTAVA SA VIŠE ODELjAKA

7.1 Definicije

(a) Transportno sredstvo sa više odeljaka: Transportno sredstvo sa dva ili više izotermičkih odeljaka, pri čemu se u svakom odeljku održava različita temperatura;

(b) Višetemperaturni mehanički rashladni uređaj: Mehanički rashladni uređaj sa kompresorom i zajedničkim usisnim otvorom, kondenzatorom i dva ili više isparivača podešena da rade na različitim temperaturama u različitim odeljcima transportnog sredstva sa više odeljaka;

(v) Jedinica domaćin: Rashladni uređaj sa ili bez integralnog isparivača;

(g) Nehlađeni odeljak: Odeljak za koji se, za potrebe dimenzionisanja i odobrenja, smatra da nema isparivač ili da je isparivač neaktivan;

(d) Višetemperaturni režim: Rad višetemperaturnog mehaničkog rashladnog uređaja sa dva ili više isparivača koji rade na različitim temperaturama u transportnom sredstvu sa više odeljaka;

(đ) Nominalna rashladna snaga: Maksimalna rashladna snaga rashladnog uređaja u jednotemperaturnom režimu kada dva ili tri isparivača rade istovremeno na istoj temperaturi;

(e) Pojedinačna rashladna snaga ($P_{poj\text{-}isp}$): Maksimalna rashladna snaga svakog od isparivača prilikom samostalnog rada sa jedinicom domaćinom;

(ž) Efektivna rashladna snaga ($P_{ef\text{-}smrz\text{-}isp}$): Rashladna snaga raspoloživa na isparivaču koji je podešen da radi na najnižoj temperaturi kada dva ili više isparivača rade u višetemperaturnom režimu, kao što je opisano u tački 7.3.5.

7.2 Postupak ispitivanja višetemperaturnih mehaničkih rashladnih uređaja

7.2.1 Opšti postupak

Opšti postupak je opisan u odeljku 4. ovog dodatka.

Jedinica domaćin se ispituje u kombinaciji sa različitim isparivačima. Svaki isparivač se ispituje u zasebnom kalorimetru, ukoliko je primenljivo.

Nominalna rashladna snaga jedinice domaćina u jednotemperaturnom režimu, kao što je opisano u tački 7.2.2, meri se u jednoj kombinaciji dva ili tri isparivača uključujući najmanji i najveći.

Pojedinačna rashladna snaga se meri na svakom od isparivača pri njihovom radu u jednotemperaturnom režimu sa jedinicom domaćinom, kao što je opisano u tački 7.2.3.

Ispitivanje se vrši sa dva ili tri isparivača uključujući najmanji, najveći i, ukoliko je neophodno, isparivač srednje veličine.

Ako višetemperaturni rashladni uređaj može raditi sa više od dva isparivača:

- Jedinica domaćin se ispituje u kombinaciji sa tri isparivača: najmanjim, najvećim i isparivačem srednje veličine.

- Dodatno, na zahtev proizvođača, jedinica domaćin se može ispitati u kombinaciji sa dva isparivača: najvećim i najmanjim.

Ispitivanja se vrše u nezavisnom režimu rada i u režimu pripravnosti.

7.2.2 Određivanje nominalne rashladne snage jedinice domaćina

Nominalna rashladna snaga jedinice domaćina u jednotemperaturnom režimu se meri sa jednom kombinacijom dva ili tri isparivača koji rade jednovremeno na istoj temperaturi. Ovo ispitivanje se obavlja na temperaturama od –20 ˚C i 0 ˚C.

Temperatura na uvodnom otvoru jedinice domaćina održava se na +30 ˚C.

Nominalna rashladna snaga na temperaturi od –10 ˚C računa se linearnom interpolacijom snaga na temperaturama od –20 ˚C i 0 ˚C.

7.2.3 Određivanje pojedinačne rashladne snage svakog isparivača

Pojedinačna rashladna snaga svakog isparivača se meri pri pojedinačnom radu sa jedinicom domaćinom. Ispitivanje se obavlja na temperaturama od –20 ˚C i 0 ˚C. Temperatura na uvodnom otvoru rashladnog uređaja se održava na +30 ˚C.

Pojedinačna rashladna snaga na temperaturi od –10 ˚C računa se linearnom interpolacijom snaga na temperaturama od 0 ˚C i –20 ˚C.

7.2.4 Ispitivanje preostalih efektivnih rashladnih snaga skupa isparivača u višetemperaturnom režimu pri referentnom toplotnom opterećenju

Preostala efektivna rashladna snaga se meri za svaki ispitivani isparivač na temperaturi od –20 ˚C pri čemu ostali isparivači rade na podešavanju termostata od 0 ˚C sa referentnim toplotnim opterećenjem od 20% pojedinačne rashladne snage datog isparivača na temperaturi od –20 ˚C. Temperatura na uvodnom otvoru jedinice domaćina održava se na +30 ˚C.

Za višetemperaturne rashladne uređaje sa više od jednog kompresora poput kaskadnih rashladnih uređaja ili uređaje sa dvostepenim kompresorom, gde se rashladne snage mogu istovremeno održavati u smrznutim i rashlađenim odeljcima, merenje efektivne rashladne snage se obavlja pri jednom dodatnom toplotnom opterećenju.

7.3 Dimenzionisanje i odobrenje višetemperaturnih rashladnih transportnih sredstava

7.3.1 Opšti postupak

Potrebna rashladna snaga za višetemperaturna transportna sredstva zasniva se na potrebnoj rashladnoj snazi za jednotemperaturna transportna sredstva definisanoj u ovom dodatku.

Spoljnu komoru transportnog sredstva sa više odeljaka mora karakterisati koeficijent *K* manji ili jednak 0,4 W/m²˚C izmeren u skladu sa odeljcima od 2. do 2.2. ovog dodatka.

Izotermija zidova spoljne komore se izračunava koristeći koeficijent *K* čitave komore izmeren u skladu sa ovim Sporazumom. Izotermija unutrašnjih pregradnih zidova se izračunava na osnovu vrednosti koeficijenta *K* navedenih u tabeli datoj u tački 7.3.7.

Za izdavanje ATP sertifikata:

- Nominalna rashladna snaga višetemperaturnog rashladnog uređaja mora biti najmanje jednaka toplotnim gubicima kroz unutrašnje pregradne i spoljne zidove pomnoženim faktorom 1,75, kao što je definisano u tački 3.2.6. ovog dodatka.

- U svakom odeljku, izračunata preostala efektivna rashladna snaga na najnižoj temperaturi svakog isparivača u višetemperaturnom režimu mora biti veća ili jednaka maksimalnoj potrebnoj rashladnoj snazi odeljka u najnepovoljnijim uslovima, kao što je definisano u tačkama 7.3.5. i 7.3.6., pomnoženoj faktorom 1,75, kao što je definisano u tački 3.2.6. ovog Dodatka.

7.3.2 Saobraznost komore u celini

Koeficijent *K* spoljne komore mora biti manji ili jednak 0,4 W/m^{2}˚C.

Unutrašnja površina komore ne sme se razlikovati za više od 20%.

Mora biti zadovoljeno:

$$P_{\text{nominalno}} > 1{,}75 \cdot K_{\text{komore}} \cdot S_{\text{komore}} \cdot \Delta T,$$

gde je:

$P_{\text{nominalno}}$ nominalna rashladna snaga višetemperaturnog rashladnog uređaja,

K_{komore} koeficijent *K* spoljne komore,

S_{komore} unutrašnja površina komore u celini,

ΔT razlika u temperaturama između spoljašnosti i unutrašnjosti komore.

7.3.3 Određivanje potrebne rashladne snage rashlađenih isparivača

Sa pregradama u datom položaju, potrebna rashladna snaga svakog rashlađenog isparivača se računa kao:

$$P_{\text{rashl-potr}} = (S_{\text{rashl-odeljka}} - \Sigma S_{\text{pregrade}}) \cdot K_{\text{komore}} \cdot \Delta T_{\text{spolj}} + \Sigma(S_{\text{pregrade}} \cdot K_{\text{pregrade}} \cdot \Delta T_{\text{unutr}}),$$

gde je:

K_{komore} koeficijent K dat u izveštaju o ispitivanju spoljne komore,

$S_{\text{rashl-odeljka}}$ površina rashlađenog odeljka pri datom položaju pregrada,

S_{pregrade} površina pregrada,

K_{pregrade} koeficijent K pregrada dat u tabeli u tački 7.3.7,

ΔT_{spolj} razlika u temperaturi rashlađenog odeljka i +30 ˚C izvan komore,

ΔT_{unutr} razlika u temperaturama rashlađenog odeljka i ostalih odeljaka. Za nehlađene odeljke za proračun se koristi temperatura od +20 ˚C.

7.3.4 Određivanje potrebne rashladne snage za smrznute odeljke

Sa pregradama u datom položaju, potrebna rashladna snaga za svaki smrznuti odeljak se računa kao:

$$P_{\text{smrz-potr}} = (S_{\text{smrz-odeljka}} - \Sigma S_{\text{pregrade}}) \cdot K_{\text{komore}} \cdot \Delta T_{\text{spolj}} + \Sigma(S_{\text{pregrade}} \cdot K_{\text{pregrade}} \cdot \Delta T_{\text{unutr}}),$$

gde je:

K_{komore} koeficijent K dat u izveštaju o ispitivanju spoljne komore,

$S_{\text{smrz-odeljka}}$ površina smrznutog odeljka pri datom položaju pregrada,

S_{pregrade} površina pregrada,

K_{pregrade} koeficijent K pregrada dat u tabeli u tački 7.3.7,

ΔT_{spolj} razlika u temperaturi smrznutog odeljka i +30 ˚C izvan komore,

ΔT_{unutr} razlika u temperaturama smrznutog odeljka i ostalih odeljaka. Za izotermičke odeljke za proračun se koristi temperatura od +20 ˚C.

7.3.5 Određivanje efektivne rashladne snage smrznutih isparivača

Efektivna rashladna snaga sa pregradama u datom položaju se računa kao:

$$P_{\text{ef-smrz-isp}} = P_{\text{poj-smrz-isp}} \cdot [1 - \Sigma(P_{\text{ef-rashl-isp}} / P_{\text{poj-rashl-isp}})],$$

gde je:

$P_{ef\text{-}smrz\text{-}isp}$ efektivna rashladna snaga smrznutog isparivača u datoj konfiguraciji,

$P_{poj\text{-}smrz\text{-}isp}$ pojedinačna rashladna snaga smrznutog isparivača na temperaturi od –20 ˚C,

$P_{ef\text{-}rashl\text{-}isp}$ efektivna rashladna snaga svakog rashlađenog isparivača u datoj konfiguraciji kao što je definisano u tački 7.3.6,

$P_{poj\text{-}rashl\text{-}isp}$ pojedinačna rashladna snaga na temperaturi od –20 ˚C svakog rashlađenog isparivača.

Prikazana proračunska metoda je primenljiva samo na višetemperaturne mehaničke rashladne uređaje sa jednostepenim kompresorom. Za višetemperaturne rashladne uređaje sa više od jednog kompresora poput kaskadnih rashladnih uređaja ili uređaje sa dvostepenim kompresorom, gde se rashladne snage mogu istovremeno održavati u smrznutim i rashlađenim odeljcima, ova proračunska metoda se ne može koristiti zbog toga što će dovesti do potcenjivanja efektivnih rashladnih snaga. Za ovakve rashladne uređaje, efektivne rashladne snage dobijaju se interpolacijom efektivnih rashladnih snaga merenim pri dva različita toplotna opterećenja data u izveštajima o ispitivanju kao što je definisano tačkom 7.2.4.

7.3.6 Deklaracija o saobraznosti

Transportno sredstvo može biti deklarisano kao višetemperaturno transportno sredstvo, ako za svaki položaj pregrada i svaki raspored temperatura u odeljcima važi:

$$P_{ef\text{-}smrz\text{-}isp} \geq 1{,}75 \cdot P_{smrz\text{-}potr},$$

$$P_{ef\text{-}rashl\text{-}isp.} \geq 1{,}75 \cdot P_{rashl\text{-}potr},$$

gde je:

$P_{ef\text{-}smrz\text{-}isp}$ efektivna rashladna snaga datog smrznutog isparivača pri temperaturi koja odgovara klasi odeljka u datoj konfiguraciji,

$P_{ef\text{-}rashl\text{-}isp}$ efektivna rashladna snaga datog rashlađenog isparivača na temperaturi koja odgovara klasi odeljka u datoj konfiguraciji,

$P_{smrz\text{-}potr}$ potrebna rashladna snaga datog odeljka na temperaturi koja odgovara klasi odeljka u datoj konfiguraciji izračunata prema tački 7.3.4,

$P_{rashl\text{-}potr}$ potrebna rashladna snaga datog odeljka na temperaturi koja odgovara klasi odeljka u datoj konfiguraciji izračunata prema tački 7.3.3.

Treba uzeti u obzir da se svi položaji pregrada mogu smatrati dimenzionisanim ukoliko su položaji koji čine različite površine odeljaka (od najmanje do najveće) provereni iterativnom metodom pri čemu korak ne sme biti veći od 20% površine.

Izjava o usaglašenosti se daje u dopunskom dokumentu uz sertifikat o saobraznosti koji izdaje nadležni organ zemlje proizvođača. Dokument treba da bude zasnovan na informacijama dobijenim od proizvođača. Izjava treba da bude u skladu sa Modelom br. 14 datim u okviru ovog priloga.

Navedeni dokument treba da sadrži najmanje:

(a) Skicu koja prikazuje stvarnu konfiguraciju odeljaka i raspored isparivača;

(b) Proračunski dokaz da oprema sa više odeljaka ispunjava zahteve Sporazuma u skladu sa željom korisnika transportnog sredstva u pogledu temperature u odeljcima i dimenzija odeljaka.

7.3.7 Unutrašnje pregrade

Toplotni gubici kroz unutrašnje pregrade proračunavaju se koristeći vrednosti koeficijenta *K* iz donje tabele.

	Koeficijent K [W/m²°C]		*Minimalna debljina osnovnog izolacionog materijala [mm]*
	Fiksna pregrada	*Pomerljiva pregrada*	
Podužna pregrada – aluminijumski pod	2	3	25
Podužna pregrada – pod od stakloplastike	1,5	2	25
Poprečna pregrada – aluminijumski pod	2	3,2	40
Poprečna pregrada – pod od stakloplastike	1,5	2,6	40

Koeficijenti *K* pomerljivih pregrada uključuju sigurnosnu granicu zbog specifičnosti starenja i neizbežnih toplotnih gubitaka.

U slučajevima specifičnih konstrukcija kada dodatni termički mostovi uzrokuju povećanje provođenja toplote u odnosu na uobičajene konstrukcije, koeficijent *K* pregrade potrebno je povećati.

7.3.8 Zahtevi odeljka 7 se ne primenjuju na transportna sredstva proizvedena pre stupanja na snagu ovih zahteva, a koja su prošla ekvivalentna ispitivanja u cilju odobrenja višetemperaturnog transportnog sredstva. Transportna sredstva proizvedena pre stupanja na snagu zahteva iz ovog odeljka mogu se koristiti u međunarodnom transportu, ali se mogu uvesti iz jedne zemlje u drugu samo uz dogovor nadležnih organa zemalja u pitanju.

8. IZVEŠTAJI O ISPITIVANjU

Izveštaj o ispitivanju odgovarajućeg transportnog sredstva treba biti formiran za svako ispitivanje u skladu sa jednim ili više modela od 1 do 14 prikazanih u nastavku.

---

[5] *Relevantni grafici se mogu naći u ATP priručniku na sledećoj adresi: https://unece.org/atp_handbook*

[6] *Kako bi se sprečilo smrzavanje.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 1 A

Izveštaj o ispitivanju

sačinjen shodno odredbama Sporazuma o međunarodnom prevozu lakokvarljivih namirnica i specijalnim sredstvima za njihov prevoz (ATP)

Izveštaj o ispitivanju br. _____

Odeljak 1

Specifikacije transportnog sredstva (izuzev cisterne namenjene za prevoz tečnih namirnica)

Ovlašćena ispitna stanica/stručnjak:[1]
Naziv/ime .....
Adresa .....
Tip transportnog sredstva:[2] .....
Marka ..... Registarska oznaka ..... Serijski broj .....
Datum početka upotrebe .....
Masa praznog transportnog sredstva[3]..... kg Korisna nosivost[3] ..... kg
Komora:
Marka i tip ..... Identifikacioni broj .....
Proizvođač .....
Vlasnik ili korisnik .....
Podnosilac zahteva .....
Datum izrade .....
Osnovne dimenzije:
Spolja: dužina ..... m, širina ..... m, visina ..... m
Unutra: dužina ..... m, širina ..... m, visina ..... m
Ukupna površina poda komore ..... m^2
Korisna unutrašnja zapremina komore ..... m^3
Korišćena metoda[1,3] …….. Korišćeni grafici[1,3] ……
Ukupna unutrašnja površina zidova komore S_i ..... m^2
Ukupna spoljna površina zidova komore S_e ..... m^2
Srednja površina: $S = \sqrt{S_i \cdot S_e}$ ..... m^2
Specifikacija zidova komore:[4]
Krov .....
Pod .....
Bočni zidovi .....
Specifičnosti konstrukcije komore:[5]
Broj, mesto i dimenzije } vrata .....; otvora za provetravanje .....; otvora za utovar leda .....

Pomoćni uređaji[6] .....
K = ...W/m^2.˚C

---

[1] *Obrisati ukoliko je nepotrebno (stručnjaci samo u slučaju ispitivanja obavljenih prema tačkama 5. i 6. Dodatka br. 2 Priloga br. 1 ATP sporazuma).*
[2] *Vagon, kamion, prikolica, poluprikolica, kontejner, itd.*
[3] *Navesti izvor ovih informacija.*

[4] *Priroda i debljina materijala koji sačinjavaju zidove od unutrašnjosti ka spoljašnosti, 5 način konstrukcije itd.*
[5] *Ako je površina nepravilna prikazati usvojeni način određivanja Si i Se.*
[6] *Poluge za meso, fletner ventilatori, itd.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 1 B

Izveštaj o ispitivanju

sačinjen shodno odredbama Sporazuma o međunarodnom prevozu lakokvarljivih namirnica i specijalnim sredstvima za njihov prevoz (ATP)

Izveštaj o ispitivanju br. _____

Odeljak 1

Specifikacije transportnog sredstva-cisterne namenjene za prevoz tečnih namirnica

---

Ovlašćena ispitna stanica/stručnjak:[1]
Naziv/ime .....
Adresa .....
Tip cisterne:[2] .....
Marka ..... Registarska oznaka ..... Serijski broj .....
Datum početka upotrebe .....
Masa prazne cisterne[3]..... kg Korisna nosivost[3] ..... kg
Cisterna:
Marka i tip ..... Identifikacioni broj .....
Proizvođač .....
Vlasnik ili korisnik .....
Podnosilac zahteva .....
Datum izrade .....
Osnovne dimenzije:
Spolja: dužina ..... m, velika osa ..... m, mala osa ..... m
Unutra: dužina ..... m, velika osa ..... m, mala osa ..... m
Korisna unutrašnja zapremina cisterne ..... m^3
Unutrašnja zapremina svakog odeljka ..... m^3
Ukupna unutrašnja površina zidova S_i ..... m^2
Unutrašnja površina svakog odeljka S_{i1} ... , S_{i2} ... , ... m^2
Ukupna spoljna površina zidova S_e ..... m^2
Srednja površina: $S = \sqrt{S_i \cdot S_e}$ ..... m^2
Specifikacija zidova:[4] .....
Specifičnosti konstrukcije cisterne:[5].....
Broj, dimenzije i opis revizionih otvora .....
Opis poklopaca revizionih otvora .....
Broj, dimenzije i opis odvodnih cevi .....
Broj i opis oslonaca cisterne .....
Pomoćni uređaji .....
K = ...W/m^2.˚C

---

[1] *Obrisati ukoliko je nepotrebno (stručnjaci samo u slučaju ispitivanja obavljenih prema tačkama 5. i 6. Dodatka br. 2 Priloga br. 1 ATP sporazuma).*
[2] *Vagon, kamion, prikolica, poluprikolica, kontejner, itd.*
[3] *Navesti izvor ovih informacija.*
[4] *Priroda i debljina materijala koji sačinjavaju zidove od unutrašnjosti ka spoljašnosti, način konstrukcije itd.*
[5] *Ako je površina nepravilna prikazati usvojeni način određivanja Si i Se.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 2 A

Odeljak 2

Merenje ukupnog koeficijenta prenosa toplote transportnih sredstava izuzev cisterni namenjenih za prevoz tečnih namirnica u skladu sa tačkom 2.1. Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Metoda ispitivanja: unutrašnje hlađenje/unutrašnje zagrevanje[1]
Datum i vreme zatvaranja vrata i drugih otvora transportnog sredstva .....
Srednje vrednosti postignute za ..... časova rada pri stalnom režimu
(od ..... do ..... časova):

a) Srednja spoljna temperatura komore: ..... T_e = ... ˚C ± ..... ˚C
b) Srednja unutrašnja temperatura komore: ..... T_i = ... ˚C ± ..... ˚C
v) Ostvarena srednja razlika u temperaturi: ΔT = ... ˚C

Maksimalna razlika u temperaturi:
izvan komore ..... ˚C
unutar komore ..... ˚C

Srednja temperatura zidova komore $\frac{T_e + T_i}{2}$ ..... ˚C
Temperatura rada razmenjivača toplote[2] ..... ˚C
Temperatura stvaranja rose vazduha izvan komore za vreme trajanja stalnog režima[2] ..... ˚C ± ..... ˚C
Ukupno trajanje ispitivanja ..... h
Trajanje stalnog režima ..... h
Utrošena snaga u razmenjivačima: W_1 ..... W
Snaga koju apsorbuju ventilatori: W_2 ..... W
Ukupni koeficijent prenosa toplote obračunat prema formuli:
Ispitivanje putem unutrašnjeg hlađenja[1] $K = \frac{W_1 - W_2}{S \cdot \Delta T}$
Ispitivanje putem unutrašnjeg zagrevanja[1] $K = \frac{W_1 + W_2}{S \cdot \Delta T}$
K = ... W/m$^{2\circ}$C
Proširena merna nesigurnost koja odgovara izvršenom ispitivanju[3] ..... %
(faktor proširenja k = ……. za prihvaćen nivo poverenja…….%)
Primedbe:[4] .....

(Popunjava se samo u slučaju da transportno sredstvo nije opremljeno toplotnim uređajem:)

Prema gornjim rezultatima ispitivanja transportno sredstvo se može, u smislu sertifikata u skladu sa Dodatkom br. 3 Priloga br. 1 ATP sporazuma, smatrati važećim za period od ne više od šest godina, sa oznakom IN/IR.[1]

Međutim, ovaj izveštaj će biti važeći kao sertifikat o odobrenju tipa u skladu sa tačkom 6. pod a) Dodatka br. 1 Priloga br. 1 ATP sporazuma samo za period od ne više od šest godina, to znači do .....

Sačinjeno u .....

na dan ....
Lice odgovorno za ispitivanje

_____

1 *Obrisati ukoliko je nepotrebno.*
2 *Samo za ispitivanje putem unutrašnjeg hlađenja*
3 *Sadašnje odredbe o korišćenju proširene nesigurnosti umesto najveće greške se primenjuju na ispitivanja izvršena posle 1. januara 2021.*
4 *Ako komora nije oblika paralelopipeda, potrebno je naznačiti tačke na kojima su merene spoljne i unutrašnje temperature.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 2 B

Odeljak 2

Merenje ukupnog koeficijenta prenosa toplote cisterni namenjenih za prevoz tečnih namirnica u skladu sa tačkom 2.2. Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Metoda ispitivanja: unutrašnje zagrevanje
Datum i vreme zatvaranja otvora cisterne .....
Srednje vrednosti postignute za ..... časova rada pri stalnom režimu
(od ..... do ..... časova):

a) Srednja spoljašnja temperatura cisterne: T_e = ... ˚C ± ..... ˚C

b) Srednja unutrašnja temperatura cisterne

$$T_i = \frac{\sum S_{in} \cdot T_{in}}{\sum S_{in}}$$ = ... ˚C ± ..... ˚C

v) Ostvarena srednja razlika u temperaturi: ΔT = ... ˚C

Maksimalna razlika u temperaturi:

Unutar cisterne ..... ˚C
Unutar svakog odeljka ..... ˚C
Izvan cisterne ..... ˚C

Srednja temperatura zidova cisterne ..... ˚C
Ukupno trajanje ispitivanja ..... h
Trajanje stalnog režima ..... h
Utrošena snaga u razmenjivačima: W_1 ..... W
Snaga koju apsorbuju ventilatori: W_2 ..... W
Ukupan koeficijent prenosa toplote obračunat prema formuli:

$$K = \frac{W_1 + W_2}{S \cdot \Delta T}$$

K = ... W/m^2˚C

Proširena merna nesigurnost koja odgovara izvršenom ispitivanju[1] ..... %
(faktor proširenja k =……. za prihvaćen nivo poverenja…….%)
Primedbe:[2]
.....

(Popunjava se samo u slučaju da cisterna nije opremljena toplotnim uređajem:)

Prema gornjim rezultatima ispitivanja cisterna se može, u smislu sertifikata u skladu sa Dodatkom br. 3 Priloga br. 1 ATP sporazuma, smatrati važećim za period od ne više od šest godina, sa oznakom IN/IR.[3]

Međutim, ovaj izveštaj će biti važeći kao sertifikat o odobrenju tipa u skladu sa tačkom 6. pod a) Dodatka br. 1 Priloga br. 1 ATP sporazuma samo za period od ne više od šest godina, to znači do .....

Sačinjeno u .....

na dan ....
Lice odgovorno za ispitivanje

[1] *Sadašnje odredbe o korišćenju proširene nesigurnosti umesto najveće greške se primenjuju na ispitivanja izvršena posle 1. januara 2021.*

[2] *Ako cisterna nije oblika paralelopipeda, potrebno je naznačiti tačke na kojima su merene spoljne i unutrašnje temperature.*

[3] *Obrisati ukoliko je nepotrebno.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 3

Odeljak 2

Terenska provera izotermije transportnih sredstava u upotrebi koju vrši stručnjak u skladu sa tačkom 5. Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Provera je zasnovana na izveštaju o ispitivanju br. ..... od dana .....
izdatog od strane ovlašćene ispitne stanice / stručnjaka (ime i adresa) .....
Stanje pri proveri:
Krov .....
Bočni zidovi .....
Zadnji zid .....
Pod .....
Vrata i otvori .....
Zaptivke .....
Odvodni otvori za čišćenje .....
Zaptivenost vazduha .....
Koeficijent *K* transportnog sredstva kada je bilo novo (kao što je prikazano u prethodnom izveštaju o ispitivanju) ..... $W/m^{2\circ}C$
Primedbe: .....

Prema gornjim rezultatima ispitivanja transportno sredstvo se može, u smislu sertifikata u skladu sa Dodatkom br. 3 Priloga br. 1 ATP sporazuma, smatrati važećim za period od ne više od tri godina, sa oznakom IN/IR.[1]

Sačinjeno u .....

na dan ....
Lice odgovorno za ispitivanje

---

[1] *Obrisati ukoliko je nepotrebno.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 4 A

Odeljak 3

Određivanje efikasnosti rashladnih uređaja rashladnih transportnih sredstava koji koriste led ili suvi led od strane ovlašćene ispitne stanice u skladu sa tačkom 3.1. izuzev 3.1.3. pod b) i pod v) Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Rashladni uređaj:

Opis .....

Vrsta rashlađivača .....

Nominalni kapacitet punjenja rashlađivača naznačen od strane proizvođača .....

Stvarno punjenje rashlađivača korišćenog za ispitivanje .....

Pogon nezavisan/zavisan/električni[1] .....

Rashladni uređaj izmenjivi/neizmenjivi[1] .....

Proizvođač .....

Tip, serijski broj .....

Datum proizvodnje (mesec/godina) .....

Uređaj za punjenje (opis, položaj; priložiti crtež ako je potrebno) .....

Uređaji za unutrašnje provetravanje:

Opis (broj uređaja, itd.) .....

Snaga električnih ventilatora ..... W

Propusna moć ..... m^3/h

Dimenzije vodova: poprečni presek ..... m^2, dužina ..... m

Zaslon na uvodnom otvoru za vazduh; opis[1] .....

Automatski uređaji .....

Srednje temperature na početku ispitivanja

Unutrašnja ..... ˚C ± ..... ˚C

Spoljna ..... ˚C ± ..... ˚C

Temperatura stvaranje rose u ispitnoj komori ..... ˚C ± ..... ˚C

Snaga unutrašnjeg grejnog sistema ..... W

Datum i vreme zatvaranja vrata i drugih otvora .....

Zapis srednje unutrašnje i spoljne temperature komore transportnog sredstva i/ili kriva koja pokazuje promenu tih temperatura u toku vremena .....

Primedbe: .....

Prema gornjim rezultatima ispitivanja transportno sredstvo se može, u smislu sertifikata u skladu sa Dodatkom br. 3 Priloga br. 1 ATP sporazuma, smatrati važećim za period od ne više od šest godina, sa oznakom .....

Međutim, ovaj izveštaj će biti važeći kao sertifikat o odobrenju tipa u skladu sa tačkom 6. pod a) Dodatka br. 1 Priloga br. 1 ATP sporazuma samo za period od ne više od šest godina, to znači do .....

Sačinjeno u .....

na dan ....

Lice odgovorno za ispitivanje

---

[1] *Obrisati ukoliko je nepotrebno.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 4 B

Odeljak 3

Određivanje efikasnosti rashladnih uređaja rashladnih transportnih sredstava sa eutektičkim pločama od strane ovlašćene ispitne stanice u skladu sa tačkom 3.1. izuzev 3.1.3. pod a) i pod v) Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Rashladni uređaj:

Opis .....

Vrsta eutektičkog rastvora .....

Nominalni kapacitet punjenja eutektičkog rastvora naznačen od strane proizvođača ..... kg

Latentna toplota pri temperaturi smrzavanja koju je utvrdio proizvođač ..... kJ/kg pri ..... ˚C

Rashladni uređaj izmenjivi/neizmenjivi[1]

Pogon nezavisan/zavisan/električni[1]

Proizvođač .....

Tip, serijski broj .....

Datum proizvodnje (mesec/godina) .....

Eutektičke ploče: Marka ..... Tip .....

Dimenzije i broj ploča, položaj; rastojanje od zidova (priložiti crtež) .....

Ukupna rezerva hladnoće za temperaturu mržnjenja koju je naveo proizvođač od ..... kJ do temperature ..... ˚C

Uređaji za unutrašnje provetravanje (ukoliko postoje):

Opis .....

Automatski uređaji .....

Mehanički rashladni uređaj (ukoliko postoji):

Marka ..... Tip ..... Broj .....

Položaj .....

Kompresor: Marka ..... Tip .....

Vrsta pogona .....

Vrsta rashlađivača .....

Kondenzator .....

Rashladna snaga navedena od strane proizvođača za naznačenu temperaturu mržnjenja i spoljnu temperaturu od +30˚C ..... W

Automatski uređaji:

Marka ..... Tip .....

Odmrzivač (ako postoji) .....

Termostat .....

Presostat NP .....

Presostat VP .....

Sigurnosni ventil .....

Ostalo .....

Pomoćni uređaji:

Električni grejači na spoju vrata:

Snaga po dužnom metru otpornika ..... W/m

Dužina otpornika ..... m

Srednja temperatura na početku ispitivanja:

Unutrašnja ..... ˚C ± ..... ˚C

Spoljna ..... ˚C ± ..... ˚C

Temperatura stvaranja rose u ispitnoj komori .....˚C ..... ˚C

Snaga unutrašnjeg grejnog sistema ..... W

Datum i vreme zatvaranja vrata i drugih otvora .....
Period akumuliranja hladnoće ..... h
Zapis srednje unutrašnje i spoljne temperature komore transportnog sredstva i/ili kriva koja pokazuje promenu tih temperatura u toku vremena .....
Primedbe: .....

Prema gornjim rezultatima ispitivanja transportno sredstvo se može, u smislu sertifikata u skladu sa Dodatkom br. 3 Priloga br. 1 ATP sporazuma, smatrati važećim za period od ne više od šest godina, sa oznakom .....

Međutim, ovaj izveštaj će biti važeći kao sertifikat o odobrenju tipa u skladu sa tačkom 6. pod a) Dodatka br. 1 Priloga br. 1 ATP sporazuma samo za period od ne više od šest godina, to znači do .....

Sačinjeno u .....

na dan ....
Lice odgovorno za ispitivanje

---

[1] *Obrisati ukoliko je nepotrebno.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 4 V

Odeljak 3

Određivanje efikasnosti rashladnih uređaja rashladnih transportnih sredstava koja koriste tečne gasove od strane ovlašćene ispitne stanice u skladu sa tačkom 3.1. izuzev 3.1.3. pod a) i pod b) Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Rashladni uređaj:

Opis .....

Pogon nezavisan/zavisan/električni[1]

Rashladni uređaj izmenjivi/neizmenjivi [1]

Proizvođač .....

Tip, serijski broj .....

Datum proizvodnje (mesec/godina) .....

Vrsta rashlađivača .....

Nominalni kapacitet punjenja rashlađivača naveden od strane proizvođača

Stvarno punjenje rashlađivača korišćenog za ispitivanje ..... kg

Opis rezervoara .....

Uređaj za punjenje (opis, položaj) .....

Uređaji za unutrašnje provetravanje:

Opis (broj, itd.) .....

Snaga električnih ventilatora ..... W

Propusna moć ..... m^3/h

Dimenzije vodova: poprečni presek ..... m^2, dužina..... m

Automatski uređaji .....

Srednje temperature na početku ispitivanja:

Unutrašnja ..... ˚C ± ..... ˚C

Spoljna ..... ˚C ± ..... ˚C

Temperatura stvaranja rose u ispitnoj komori ..... ˚C ± ..... ˚C

Snaga unutrašnjeg grejnog sistema ..... W

Datum i vreme zatvaranja vrata i drugih otvora .....

Zapis srednje unutrašnje i spoljne temperature komore transportnog sredstva i/ili kriva koja pokazuje promenu tih temperatura u toku vremena .....

Primedbe: .....

Prema gornjim rezultatima ispitivanja transportno sredstvo se može, u smislu sertifikata u skladu sa Dodatkom br. 3 Priloga br. 1 ATP sporazuma, smatrati važećim za period od ne više od šest godina, sa oznakom .....

Međutim, ovaj izveštaj će biti važeći kao sertifikat o odobrenju tipa u skladu sa tačkom 6. pod a) Dodatka br. 1 Priloga br. 1 ATP sporazuma samo za period od ne više od šest godina, to znači do .....

Sačinjeno u .....

na dan ....

Lice odgovorno za ispitivanje

---

[1] *Obrisati ukoliko je nepotrebno.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 5

Odeljak 3

Određivanje efikasnosti rashladnih uređaja transportnih sredstava-hladnjača od strane ovlašćene ispitne stanice u skladu sa tačkom 3.2. Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Mehanički rashladni uređaji:

Pogon nezavisan/zavisan/električnim[1]
Mehanički rashladni uređaji izmenjivi/neizmenjivi[1]
Proizvođač .....
Tip, serijski broj .....
Datum proizvodnje (mesec/godina) .....

Punjenje rashlađivača:

Vrsta rashlađivača (na osnovu ISO/ASHRAE)[a)]…….
Kapacitet punjenja .....
Efektivna rashladna snaga utvrđena od strane proizvođača za spoljnu temperaturu od +30 ˚C i unutrašnju temperaturu od:
0 ˚C .....W
−10 ˚C .....W
−20 ˚C .....W

Kompresor:

Marka ..... Tip .....
Pogon: električni, toplotni, hidraulički[1]
Opis .....
Marka ..... Tip ..... Snaga ..... kW ..... pri ..... o/min
Kondenzator i isparivač .....
Motor ventilatora: marka ..... tip ..... broj .....
snaga ..... kW pri ..... o/min

Uređaji za unutrašnje provetravanje:

Opis (broj uređaja, itd.) .....
Snaga električnih ventilatora .....W
Propusna moć ..... m^3/h
Dimenzije vodova: poprečni presek ..... m^2, dužina ..... m

Automatski uređaji:

Marka ..... Tip .....
Odmrzivač (ako postoji) .....
Termostat .....
Presostat NP .....
Presostat VP .....
Sigurnosni ventil .....
Drugo .....

Srednje temperature na početku ispitivanja:

Unutrašnja ..... ˚C ± ..... ˚C
Spoljna ..... ˚C ± ..... ˚C
Temperatura stvaranja rose u ispitnoj komori ..... ˚C ± ..... ˚C

Snaga unutrašnjeg grejnog sistema ..... W
Datum i vreme zatvaranja vrata i drugih otvora .....
Zapis srednje unutrašnje i spoljne temperature komore transportnog sredstva i/ili kriva koja pokazuje promenu tih temperatura u toku vremena .....

Vreme od početka ispitivanja do dostizanja propisane srednje unutrašnje temperature komore transportnog sredstva ..... h
Primedbe: .....

Prema gornjim rezultatima ispitivanja transportno sredstvo se može, u smislu sertifikata u skladu sa Dodatkom br. 3 Priloga br. 1 ATP sporazuma, smatrati važećim za period od ne više od šest godina, sa oznakom .....

Međutim, ovaj izveštaj će biti važeći kao sertifikat o odobrenju tipa u skladu sa tačkom 6. pod a) Dodatka br. 1 Priloga br. 1 ATP sporazuma samo za period od ne više od šest godina, to znači do .....

Sačinjeno u .....

na dan ....
Lice odgovorno za ispitivanje

---

[1] *Obrisati ukoliko je nepotrebno.*
[a)] *Ukoliko postoji.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 6

Odeljak 3

Određivanje efikasnosti grejnih uređaja transportnih sredstava za zagrevanje od strane ovlašćene ispitne stanice u skladu sa tačkom 3.3. Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Grejni uređaj:

Opis .....

Pogon zavisan/nezavisan/električni[1]

Grejni uređaj izmenjivi/neizmenjivi [1]

Proizvođač .....

Tip, serijski broj .....

Datum proizvodnje (mesec/godina) .....

Položaj .....

Ukupna površina razmenjivača toplote ..... m^2

Efektivna snaga navedena od strane proizvođača ..... kW

Uređaji za unutrašnje provetravanje:

Opis (broj uređaja itd.) .....

Snaga električnih ventilatora ..... W

Propusna moć ..... m^3/h

Dimenzije vodova: poprečni presek ..... m^2, dužina ..... m

Srednje temperature na početku ispitivanja:

Unutrašnja ..... ˚C ± ..... ˚C

Spoljna ..... ˚C ± ..... ˚C

Datum i vreme zatvaranja vrata i drugih otvora .....

Zapis srednje unutrašnje i spoljne temperature komore transportnog sredstva i/ili kriva koja pokazuje promenu tih temperatura u toku vremena .....

Vreme od početka ispitivanja do dostizanja propisane srednje unutrašnje temperature komore transportnog sredstva ..... h

Tamo gde je primenljivo, srednja grejna snaga korišćena za vreme ispitivanja da bi se održala propisana razlika[2] temperatura između unutrašnje i spoljne strane tela ..... W

Primedbe: .....

Prema gornjim rezultatima ispitivanja transportno sredstvo se može, u smislu sertifikata u skladu sa Dodatkom br. 3 Priloga br. 1 ATP sporazuma, smatrati važećim za period od ne više od šest godina, sa oznakom .....

Međutim, ovaj izveštaj će biti važeći kao sertifikat o odobrenju tipa u skladu sa tačkom 6. pod a) Dodatka br. 1 Priloga br. 1 ATP sporazuma samo za period od ne više od šest godina, to znači do .....

Sačinjeno u .....

na dan ....

Lice odgovorno za ispitivanje

---

[1] *Obrisati ukoliko je nepotrebno.*

[2] *Povećana za 35% u slučaju novog transportnog sredstva.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 7

Odeljak 3

Određivanje efikasnosti rashladnih i grejnih uređaja transportnih sredstava-hladnjača sa mogućnošću zagrevanja od strane ovlašćene ispitne stanice u skladu sa tačkom 3.4 Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Mehanički rashladni uređaji:

Pogon nezavisan/zavisan/električni[1]

Mehanički rashladni uređaji izmenjivi/neizmenjivi[1]

Proizvođač .....

Tip, serijski broj .....

Datum proizvodnje (mesec/godina) .....

Punjenje rashlađivača:

Vrsta rashlađivača (na osnovu ISO/ASHRAE)[a)]…….

Kapacitet punjenja .....

Efektivna rashladna snaga utvrđena od strane proizvođača za spoljnu temperaturu od +30 ˚C i unutrašnju temperaturu od:

0 ˚C .....W

−10 ˚C .....W

−20 ˚C .....W

Kompresor:

Marka ..... Tip .....

Pogon: električni/toplotni/hidraulički/ostalo[1]

Opis .....

Marka ..... Tip ..... Snaga ..... kW ..... pri ..... o/min

Kondenzator i isparivač .....

Motor ventilatora: marka ..... tip ..... broj .....

snaga ..... kW pri ..... o/min

Grejni uređaj:

Opis .....

Pogon zavisan/nezavisan/električni[1]

Grejni uređaj izmenjivi/neizmenjivi [1]

Proizvođač .....

Tip, serijski broj .....

Datum proizvodnje (mesec/godina) .....

Položaj .....

Ukupna površina razmenjivača toplote ..... m^2

Efektivna snaga navedena od strane proizvođača ..... kW

Uređaji za unutrašnje provetravanje:

Opis (broj uređaja itd.) .....

Snaga električnih ventilatora ..... W

Propusna moć ..... m^3/h

Dimenzije vodova: poprečni presek ..... m^2, dužina ..... m

Automatski uređaji:

Marka ..... Tip .....

Odmrzivač (ako postoji) .....

Termostat .....

Presostat NP .....

Presostat VP .....
Sigurnosni ventil .....
Drugo .....
Srednje temperature na početku ispitivanja:
Unutrašnja ..... ˚C ± ..... ˚C
Spoljna ..... ˚C ± ..... ˚C
Temperatura stvaranja rose u ispitnoj komori[2] ..... ˚C ± ..... ˚C
Snaga unutrašnjeg grejnog sistema ..... W
Datum i vreme zatvaranja vrata i drugih otvora .....
Zapis srednje unutrašnje i spoljne temperature komore transportnog sredstva i/ili kriva koja pokazuje promenu tih temperatura u toku vremena .....
Vreme od početka ispitivanja do dostizanja propisane srednje unutrašnje temperature komore transportnog sredstva ..... h
Tamo gde je primenljivo, srednja grejna snaga korišćena za vreme ispitivanja da bi se održala propisana razlika[3] temperatura između unutrašnje i spoljne strane komore[4] ..... W
Primedbe: .....

Prema gornjim rezultatima ispitivanja transportno sredstvo se može, u smislu sertifikata u skladu sa Dodatkom br. 3 Priloga br. 1 ATP sporazuma, smatrati važećim za period od ne više od šest godina, sa oznakom .....

Međutim, ovaj izveštaj će biti važeći kao sertifikat o odobrenju tipa u skladu sa tačkom 6. pod a) Dodatka br. 1 Priloga br. 1 ATP sporazuma samo za period od ne više od šest godina, to znači do .....

Sačinjeno u .....

na dan ....
Lice odgovorno za ispitivanje

---

[1] *Obrisati ukoliko je nepotrebno.*
[2] *Samo u slučaju rashladnog uređaja.*
[3] *Uvećana za 35% za novo sredstvo.*
[4] *Samo za uređaje za grejanje.*
[a)] *Ukoliko postoji.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 8

Odeljak 3

Terenska provera efikasnosti rashladnih uređaja rashladnog transportnog sredstva u upotrebi koju vrši stručnjak u skladu sa tačkom 6.1. Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Provera je zasnovana na izveštaju o ispitivanju br. ..... od dana ..... izdatog od strane ovlašćene ispitne stanice/stručnjaka (naziv/ime i adresa) .....

Rashladni uređaj:

Opis .....

Proizvođač .....

Tip, serijski broj .....

Datum proizvodnje (mesec/godina) .....

Vrsta rashlađivača .....

Nominalni kapacitet punjenja rashlađivača naveden od strane proizvođača

Stvarno punjenje rashlađivača korišćenog za ispitivanje ..... kg

Uređaj za punjenje (opis, položaj) .....

Uređaji za unutrašnje provetravanje:

Opis (broj uređaja itd.) .....

Snaga električnih ventilatora ..... W

Propusna moć ..... m^3/h

Dimenzije vodova: poprečni presek ..... m^2, dužina ..... m

Stanje rashladnih i uređaja za ventilaciju .....

Ostvarena unutrašnja temperatura ..... ˚C

Pri spoljnoj temperaturi ..... ˚C

Unutrašnja temperatura transportnog sredstva pre pokretanja rashladnog uređaja ..... ˚C

Ukupno vreme rada rashladnog uređaja ..... h

Vreme od početka ispitivanja do dostizanja propisane srednje unutrašnje temperature komore transportnog sredstva ..... h

Funkcionalna provera termostata .....

Za rashladni uređaj sa eutektičkim pločama:

Vreme rada rashladnog uređaja za smrzavanje eutektičkog rastvora ..... h

Vreme za koje se unutrašnja temperatura vazduha održava posle isključivanja uređaja ..... h

Primedbe: .....

Prema gornjim rezultatima ispitivanja transportno sredstvo se može, u smislu sertifikata u skladu sa Dodatkom br. 3 Priloga br. 1 ATP sporazuma, smatrati važećim za period od ne više od tri godine, sa oznakom .....

Sačinjeno u .....

na dan ....

Lice odgovorno za ispitivanje

MODEL IZVEŠTAJA O ISPITIVANjU BR. 9

Odeljak 3

Terenska provera efikasnosti rashladnih uređaja transportnih sredstava-hladnjača u upotrebi koju vrši stručnjak u skladu sa tačkom 6.2 Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Provera je zasnovana na izveštaju o ispitivanju br. ..... od dana ..... izdatog od strane ovlašćene ispitne stanice/stručnjaka (naziv/ime i adresa) .....

Mehanički rashladni uređaj:

Proizvođač .....

Tip, serijski broj .....

Datum proizvodnje (mesec/godina) .....

Opis .....

Efektivna rashladna snaga navedena od strane proizvođača za spoljnu temperaturu od +30 ˚C i unutrašnju temperaturu od:

0 ˚C .....W

−10 ˚C .....W

−20 ˚C .....W

Vrsta rashlađivača (na osnovu ISO/ASHRAE)[a)] ……..

Kapacitet punjenja .....

Uređaji za unutrašnje provetravanje:

Opis (broj uređaja itd.) .....

Snaga električnih ventilatora ..... W

Propusna moć ..... m^3/h

Dimenzije vodova: poprečni presek ..... m^2, dužina ..... m

Stanje mehaničkih rashladnih i uređaja za unutrašnje provetravanje .....

Dostignuta unutrašnja temperatura ..... ˚C

Pri spoljnoj temperaturi od ..... ˚C

i sa relativnim vremenom rada od ..... %

Vreme rada ..... h

Funkcionalna provera termostata .....

Primedbe: .....

Prema gornjim rezultatima ispitivanja transportno sredstvo se može, u smislu sertifikata u skladu sa Dodatkom br. 3 Priloga br. 1 ATP sporazuma, smatrati važećim za period od ne više od tri godine, sa oznakom .....

Sačinjeno u .....

na dan ....

Lice odgovorno za ispitivanje

[a)] *Ukoliko postoji.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 10

Odeljak 3

Terenska provera efikasnosti grejnih uređaja transportnih sredstava za zagrevanje u upotrebi koju vrši stručnjak u skladu sa tačkom 6.3. Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Provera je zasnovana na izveštaju o ispitivanju br. ..... od dana ..... izdatog od strane ovlašćene ispitne stanice/stručnjaka (naziv/ime i adresa) .....
Grejni uređaj:
Opis.....
Proizvođač .....
Tip, serijski broj .....
Datum proizvodnje (mesec/godina) .....
Položaj .....
Ukupna površina razmenjivača toplote ..... m^2
Efektivna snaga navedena od strane proizvođača ..... kW
Uređaji za unutrašnje provetravanje:
Opis (broj uređaja, itd.) .....
Snaga električnih ventilatora ..... W
Propusna moć ..... m^3/h
Dimenzije vodova: poprečni presek ..... m^2, dužina ..... m
Stanje grejnog i uređaja za unutrašnje provetravanje .....
Postignuta unutrašnja temperatura ..... ˚C
Pri spoljnoj temperaturi od ..... ˚C
i sa relativnim vremenom rada od ..... %
Vreme rada ..... h
Funkcionalna provera termostata .....
Primedbe: .....

Prema gornjim rezultatima ispitivanja transportno sredstvo se može, u smislu sertifikata u skladu sa Dodatkom br. 3 Priloga br. 1 ATP sporazuma, smatrati važećim za period od ne više od tri godine, sa oznakom .....
Sačinjeno u .....

na dan ....
Lice odgovorno za ispitivanje

MODEL IZVEŠTAJA O ISPITIVANjU BR. 11

Odeljak 3

Terenska provera efikasnosti rashladnih i grejnih uređaja transportnih sredstava-hladnjača sa mogućnošću zagrevanja u upotrebi koju vrši stručnjak u skladu sa tačkom 6.4. Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Provera je zasnovana na izveštaju o ispitivanju br. ..... od dana ..... izdatog od strane ovlašćene ispitne stanice/stručnjaka (naziv/ime i adresa) .....

Mehanički rashladni uređaji:

Proizvođač .....

Tip, serijski broj .....

Datum proizvodnje (mesec/godina) .....

Opis……

Efektivna rashladna snaga utvrđena od strane proizvođača za spoljnu temperaturu od +30 ˚C i unutrašnju temperaturu od:

0 ˚C .....W

−10 ˚C .....W

−20 ˚C .....W

Punjenje rashlađivača:

Vrsta rashlađivača (na osnovu ISO/ASHRAE) [a)]…….

Kapacitet punjenja .....

Grejni uređaj:

Opis .....

Proizvođač .....

Tip, serijski broj .....

Datum proizvodnje (mesec/godina) .....

Položaj ……..

Ukupna površina razmenjivača toplote ..... m^2

Efektivna snaga navedena od strane proizvođača ..... kW

Uređaji za unutrašnje provetravanje:

Opis (broj uređaja itd.) .....

Snaga električnih ventilatora ..... W

Propusna moć ..... m^3/h

Dimenzije vodova: poprečni presek ..... m^2, dužina ..... m

Stanje rashladnog uređaja, grejnog uređaja i uređaja za unutrašnje provetravanje……

……..

Dostignuta unutrašnja temperatura……. ˚C

Na spoljnoj temperaturi od …. ˚C

i sa relativnim vremenom rada od ….. %

Vreme u radu ……..h

Funkcionalna provera termostata .....

Primedbe: .....

Prema gornjim rezultatima ispitivanja transportno sredstvo se može, u smislu sertifikata u skladu sa Dodatkom br. 3 Priloga br. 1 ATP sporazuma, smatrati važećim za period od ne više od tri godine, sa oznakom .....

Sačinjeno u .....

na dan ....

Lice odgovorno za ispitivanje

[a)] *Ukoliko postoji.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 12

Izveštaj o ispitivanju

Pripremljen u skladu sa odredbama Sporazuma o međunarodnom prevozu lakokvarljivih namirnica i specijalnim sredstvima za njihov prevoz (ATP)

Izveštaj o ispitivanju broj .....

Određivanje efektivne snage rashladnog uređaja u skladu sa tačkom 4. Dodatka br. 2 Priloga br. 1 ATP sporazuma

---

Datum ispitivanja od DD/MM/GGGG do DD/MM/GGGG
Ovlašćena ispitna stanica
Naziv: .....
Adresa: .....
Rashladni uređaj dostavljen od: .....
a) Tehnička specifikacija uređaja
Datum proizvodnje (mesec/godina): ..... Marka: .....
Tip: ..... Serijski broj:.....
Kategorija[1]
Samostalan/nesamostalan
Izmenjivi/neizmenjivi
Jedinstven sklop/sastavljene komponente
Opis: .....
Kompresor: Marka: ..... Tip: .....
Broj cilindara: ..... Radna zapremina: .....
Nominalni broj obrtaja: ..... o/min
Vrsta pogona[1]: elektromotor, poseban motor sa unutrašnjim sagorevanjem, motor vozila, kretanje vozila
Motor za pogon kompresora[1,2]:
Električni: Marka: ..... Tip: .....
Snaga: ..... kW pri: ..... o/min
Napon napajanja: ..... V Frekvencija napajanja: ..... Hz
Motor sa unutrašnjim sagorevanjem: Marka: ..... Tip: .....
Broj cilindara: ..... Radna zapremina: .....
Snaga: ..... kW pri: ..... o/min
Vrsta goriva: .....
Hidraulični motor: Marka: ..... Tip: .....
Vrsta pogona: .....
Alternator: Marka: ..... Tip: .....
Vrsta pogona: ..... Drugo: ……
Broj obrtaja: { nominalni broj obrtaja dat od proizvođača: ..... o/min
minimalni broj obrtaja: ..... o/min

Punjenje rashlađivača.....
Vrsta rashlađivača (na osnovu ISO/ASHRAE)[a)]…….
Kapacitet punjenja .....

Razmenjivači toplote		Kondenzator	Isparivač
Marka[2]			
Tip (ukoliko je primenjivo)[2]			
Broj cevi			
Korak lopatica (mm)[2]			
Cev: materijal i prečnik (mm^2)			
Površina na kojoj se vrši razmena (m^2)[2]			
Čeona površina (m^2)			
Ventilatorska kola	Broj		
	Broj lopatica po kolu		
	Prečnik (mm)		
	Nominalna snaga (W)[2,3]		
	Ukupna propusna moć pri pritisku od ..... Pa (m^3/h)[2]		
	Vrsta pogona		

Ekspanzioni ventil: Marka:..... Tip:.....
Podesiv:[1]..... Nepodesiv:[1].....
Odmrzivač: .....
Automatski uređaj: .....

Rezultati merenja i rashladne performanse

(Srednja temperatura vazduha na uvodnom otvoru (uvodnim otvorima) rashladnog uređaja ..... ˚C)

Efektivna rashladna snaga		W	. ...	. ...
Unutrašnja temperatura	Na ulasku u isparivač	˚C	....	....
	Srednja	˚C	....	....
Srednja spoljna temperatura		˚C	: ..... : ..... :	: ..... : ..... : .....
Potrošnja goriva ili električne energije		W ili l/h	....	....
Snaga koju utroši ventilator hladnjaka[4]		W	....	....
Snaga ventilatora unutrašnjeg grejača		W	....	....
Brzina obrtanja	Kompresora[3]	o/min	....	....
	Alternatora[3]	o/min	....	....
	Ventilatora[3]	o/min	....	....
			Nominalna	Minimalna

b) Metoda ispitivanja i rezultati:

Metoda ispitivanja[1]: metoda ravnoteže toplote/metoda razlike entalpija
U kalorimetrijskoj kutiji srednje površine = ... m^2
izmerena vrednost koeficijenta *U* kutije sa postavljenim rashladnim uređajem: ..... W/ ˚C
pri srednjoj temperaturi zida ..... ˚C.
U transportnom sredstvu:
izmerena vrednost koeficijenta *U* transportnog sredstva sa postavljenim rashladnim uređajem ..... W/ ˚C
pri srednjoj temperaturi zida ..... ˚C.
Primenjena metoda za korekciju koeficijenta *U* komore u zavisnosti od srednje temperature zida komore: .....
Maksimalna greška pri određivanju:
koeficijenta *U* komore.....
snage rashladnog uređaja .....

v) Provere
Regulator temperature: Podešavanje ..... ˚C Razlika ..... ˚C
Funkcionisanje odmrzivača[1]: zadovoljavajuće / nezadovoljavajuće
Zapreminski protok vazduha na izlasku iz isparivača: ..... izmerena vrednost ..... m^3/h pri:
- Razlici pritisaka izmerenih između vazduha na izlazu i ulazu u isparivač od 0 Pa
- Apsolutnom barometarskom pritisku vazduha od ……..hPa

Postojanje načina snabdevanja toplotom isparivača radi podešavanja termostata između 0 i 12 ˚C[1]: da/ne

g) Primedbe:

U skladu sa gorenavedenim rezultatima ispitivanja, izveštaj o ispitivanju treba da bude važeći kao ATP sertifikat u skladu sa tačkom 6 a) Dodatka br.1 Priloga br. 1 samo za period ne duži od 6 godina, to znači do: …….

Sačinjeno u .....

na dan ....
Lice odgovorno za ispitivanje

---

[1] *Obrisati ukoliko je nepotrebno.*
[2] *Vrednost koju daje proizvođač.*
[3] *Gde je primenljivo.*
[4] *Samo za metodu razlike entalpija.*
[a)] *Ukoliko postoji.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 13

Izveštaj o ispitivanju

Pripremljen u skladu sa odredbama Sporazuma o međunarodnom prevozu lakokvarljivih namirnica i specijalnim sredstvima za njihov prevoz (ATP)

Izveštaj o ispitivanju broj .....

Određivanje efektivne snage rashladnog uređaja u skladu sa tačkom 9. Dodatka br. 2 Priloga br. 1 ATP sporazuma

Ispitivanje izvršeno od DD/MM/GGGG do DD/MM/GGGG

Ovlašćena ispitna stanica
Naziv: .....
Adresa: .....
Rashladni uređaj dostavljen od: .....
a) Tehnička specifikacija uređaja
Marka: .....
Tip: .....
Tip tečnog gasa: ……..
Serijski broj:.....
Datum proizvodnje (mesec/godina): .....
(Ispitana jedinica ne treba da bude proizvedena više od godinu dana pre ATP ispitivanja.)
Opis: .....
Regulacioni ventil (ukoliko se koriste različite vrste ventilatora, podatke ispod ponoviti za svaki tip)

Marka: ……..
Tip: ……
Serijski broj: …….
Rezervoar (ukoliko se koriste različite vrste ventilatora, podatke ispod ponoviti za svaki tip)
Marka: ……..
Tip: ……
Serijski broj: …….
Zapremina [l]: ……..
Pritisak gasa na izlazu iz rezervoara: ……
Materijal izolacije: ……..
Materijal unutrašnjosti rezervoara: ……..
Materijal spoljašnjosti rezervoara: ……
Izvor tečnog gasa: ……(unutrašnji pritisak, pritisak razmenjivača toplote, pumpe)[1]
Regulator pritiska
Marka: ……..
Tip: ……
Serijski broj: …….
Pritisak gasa na izlazu: ……
Dovodne cevi tečnog gasa (na ispitni sto):
Prečnik: ……
Dužina: ……
Materijal: …….
Broj priključaka: ……

Uređaj za odmrzavanje (električna jedinica / jedinica sa motorom sa unutrašnjim sagorevanjem)[1]
Marka: ……..
Tip: ……
Dovod: …….
Deklarisana grejna snaga: ……
Regulator
Marka: ……..
Tip: ……
Verzija hardvera: ……
Verzija softvera: ……..
Serijski broj: …….
Izvor napajanja: ……
Mogućnost za višetemperaturni rad: (da/ne)[1]
Broj odeljaka u stanju da rade u višetemperaturnom režimu:

Razmenjivači toplote		Kondenzator	Isparivač
Marka-tip			
Broj kola			
Broj redova			
Broj pokrivača			
Broj cevi			
Korak lopatica (mm)			
Cev: materijal i prečnik (mm)[2]			
Površina na kojoj se vrši razmena (m^2)[2]			
Čeona površina (m^2)			
Ventilatori	Marka-tip		
	Broj		
	Broj lopatica po kolu		
	Prečnik (mm)		
	Snaga (W)[2]		
	Nominalni broj obrtaja [o/min][2]		
	Ukupna propusna moć (m^3/h) pri pritisku od 0 Pa [2]		
	Vrsta pogona (jednosmerna/naizmenična struja, frekvencija, itd.)		

b) Metoda ispitivanja i rezultati:
Metoda ispitivanja[1]: metoda toplotne ravnoteže/metoda razlike entalpija
U kalorimetrijskoj kutiji srednje površine = ... m^2
izmerena vrednost koeficijenta *U* kutije sa postavljenim rashladnim uređajem: ..... W/ ˚C
pri srednjoj temperaturi zida ..... ˚C.
U transportnom sredstvu:

izmerena vrednost koeficijenta *U* dela transportnog sredstva sa postavljenim rashladnim uređajem ..... W/ ˚C
pri srednjoj temperaturi zida ..... ˚C.

Primenjena metoda za korekciju koeficijenta *U* komore u zavisnosti od srednje temperature zida komore: .....

Maksimalna greška pri određivanju:
koeficijenta *U* komore.....
snage uređaja sa tečnim gasom .....

Srednja temperatura vazduha na spoljnoj površini rezervoara: …….. ˚C
Izvor električne energije: ……..

Potrošnja tečnog gasa	Potrošnja struje	Pritisak na izlazu iz rezervoara	Temperatura tečnosti u isparivaču	Spoljna temperatura	Unutrašnja temperatura	Grejna snaga	Temperatura vazduha na uvodnom otvoru isparivača	Korisna rashladna snaga
[kg/h]	[Vdc] i [A]	[bar abs]	[˚C]	[˚C]	[˚C]	[W]	[˚C]	[W]

Korigovana snaga hlađenja [W]:

v) Provere
Regulator temperature: Podešavanje ..... Razlika ..... ˚C
Funkcionisanje odmrzivača[1]: zadovoljavajuće / nezadovoljavajuće
Zapreminski protok vazduha na izlasku iz isparivača:
izmerena vrednost ..... m^3/h
pri pritisku od ..... Pa
pri temperaturi od ……˚C
pri broju obrtaja …….. o/min

Najmanja zapremina rezervoara: ……..

g) Primedbe:
……..

Ovaj izveštaj je važeći najviše šest godina od datuma završetka ispitivanja.

Sačinjeno u .....

na dan ....
Lice odgovorno za ispitivanje

---

[1] *Obrisati ukoliko je nepotrebno.*
[2] *Vrednost koju daje proizvođač.*

MODEL IZVEŠTAJA O ISPITIVANjU BR. 14

Izjava o saobraznosti za višetemperaturno transportno sredstvo sa više odeljaka

Dopunski dokument sertifikatu o saobraznosti u skladu sa tačkom 7.3.6. Dodatka br. 2 Priloga br. 1

Skica rasporeda sredstva (pogled odozgo), koja pokazuje:

– prednji i zadnji kraj, numerisanje odeljaka;

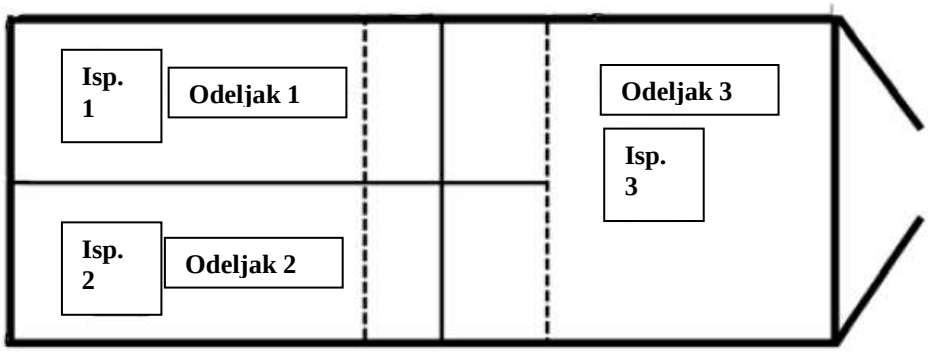
– raspored odeljaka sa nepokretnim i pokretnim pregradama i sledeće dimenzije u centimetrima: unutrašnje dimenzije izotermičke komore, debljinu i dužinu pregrada;

– krajnji položaj pokretnih pregradnih zidova;

– Položaj jedinice domaćina i isparivača;

– materijal poda.

(Primer skice pogleda odozgo)



Izotermička komora:

Broj ATP izveštaja o ispitivanju: .....

Proizvođač: .....

Serijski broj: .....

Jedinica domaćin:

Broj ATP izveštaja o ispitivanju: .....

Proizvođač: .....

Serijski broj: .....

Isparivači:

Broj ATP izveštaja o ispitivanju: .....

Proizvođač: .....

Tip: .....

Napomene:

(na primer, ograničenja u temperaturi ili dimenzijama odeljaka, upotreba posebnih dodataka kao što su zavese, itd.)

Overa

Naziv nadležnog organa: .....

Adresa: .....

Broj telefona: .....

Imejl adresa: .....

Datum i mesto potpisa: .....

Pečati, potpis i ime lica odgovornog za ispitivanje: .....

9. POSTUPAK MERENjA RASHLADNE SNAGE UREĐAJA SA TEČNIM GASOM I DIMENZIONISANjE TRANSPORTNIH SREDSTAVA KOJI KORISTE OVE UREĐAJE

9.1 Definicije

a) Uređaj sa tečnim gasom se sastoji iz rezervoara koji sadrži tečni gas, regulacionog sistema, sistema za međusobno povezivanje, prigušivača ukoliko je primenljivo i jednog ili više isparivača;
b) Primarni isparivač: bilo koja najmanja struktura koja sadrži uređaj sa tečnim gasom koji treba da apsorbuje toplotnu snagu u izotermičkom odeljku;
v) Isparivač: bilo koji sastav koji čine primarni isparivači koji se nalaze u izotermičkom odeljku;
g) Najveći nominalni isparivač: bilo koji sastav koji čine primarni isparivači koji se nalaze u jednom ili više izotermičkih odeljaka;
d) Jednotemperaturni uređaj sa tečnim gasom: uređaj sa tečnim gasom koja se sastoji iz rezervoara za tečni gas povezanog na jedan isparivač za regulaciju temperature jednog izotermičkog odeljka;
đ) Višetemperaturni uređaj sa tečnim gasom: uređaj sa tečnim gasom koja se sastoji iz rezervoara za tečni gas povezanog na najmanje dva isparivača, od kojih svaki reguliše temperaturu jednog određenog izotermičkog odeljka u istom transportnom sredstvu sa više odeljaka;
e) Jednotemperaturni režim: rad jedno- ili višetemperaturnog uređaja sa tečnim gasom u kojem je aktivan jedan isparivač i održava temperaturu jednog odeljka u transportnom sredstvu sa jednim ili više odeljaka;
ž) Višetemperaturni režim: rad višetemperaturnog uređaja sa tečnim gasom sa dva ili više aktivnih isparivača koji održavaju dve različite temperature u izotermičkim odeljcima transportnog sredstva sa više odeljaka;
z) Najveća nominalna rashladna snaga ($P_{maks\text{-}nom}$): najveća rashladna snaga određena od strane proizvođača uređaja sa tečnim gasom;
i) Nominalna instalisana rashladna snaga ($P_{nom\text{-}ins}$): najveća rashladna snaga u okviru najveće nominalne rashladne snage koja može biti obezbeđena od strane date konfiguracije isparivača uređaja sa tečnim gasom;
j) Pojedinačna rashladna snaga ($P_{poj\text{-}isp}$): najveća rashladna snaga koju isporučuje svaki od isparivača pri čemu uređaj sa tečnim gasom radi kao jednotemperaturni uređaj;
k) Efektivna rashladna snaga ($P_{ef\text{-}smrz\text{-}isp}$): rashladna snaga obezbeđena isparivaču na najnižoj temperaturi kada uređaj sa tečnim gasom radi kao što je opisano u tački 9.2.4.

9.2 Postupak ispitivanja za uređaje sa tečnim gasom

9.2.1 Opšti postupak

Postupak ispitivanja treba da bude u skladu sa postupkom koji je naveden u delu 4 Dodatka br. 2 Priloga br. 1 ATP sporazuma, uzimajući u obzir sledeće pojedinosti.

Ispitivanja se vrše za različite primarne isparivače. Svaki primarni isparivač treba da bude ispitan na posebnom kalorimetru, ako je primenljivo, i postavljen u ćeliju za ispitivanje sa kontrolisanom temperaturom.

Za jednotemperaturne uređaje sa tečnim gasom, meri se samo rashladna snaga regulacionog uređaja sa isparivačem koji ima najveću nominalnu snagu. Treći temperaturni nivo je dodat u skladu sa tačkom 4 Dodatka br. 2 Priloga br. 1 ATP sporazuma.

Za višetemperaturne uređaje sa tečnim gasom, pojedinačna rashladna snaga treba da se meri za svaki primarni isparivač, pri čemu svaki radi u jednotemperaturnom režimu kao što je navedeno u tački 9.2.3.

Rashladne snage se određuju korišćenjem rezervoara za tečni gas koji dostavlja proizvođač, što omogućuje da se kompletno ispitivanje odvija bez dopunjavanja.

Sve elemente rashladnog uređaja sa tečnim gasom treba postaviti u termostatičko kućište održavano na temperaturi od 30 ± 0,5 °C.

Za svako ispitivanje potrebno je zabeležiti sledeće podatke:

Protok, temperaturu i pritisak tečnog gasa na izlazu iz rezervoara u upotrebi;

Napon, jačinu struje i ukupnu potrošnju električne energije od strane uređaja sa tečnim gasom (na primer ventilator...);

Protok gasa jednak je srednjoj masenoj potrošnji fluida tokom sprovedenog ispitivanja.

Osim u slučaju određivanja protoka tečnog gasa, svaka veličina treba da fizički bude sakupljana tokom fiksnog perioda vremena koji je manji ili jednak 10 sekundi i svaka veličina treba da bude zabeležena tokom fiksnog perioda vremena od najviše 2 minuta, pod sledećim uslovima:

Svaka temperatura zabeležena na uvodnom otvoru za vazduh provetravanog isparivača ili unutar neprovetravanog isparivača treba da bude usaglašena sa temperaturom očekivane klase ±1 °C.

Ukoliko električne komponente uređaja sa tečnim gasom mogu biti pogonjene pomoću više od jednog izvora električne energije, ispitivanja je potrebno sprovesti shodno tome.

Ukoliko ispitivanja pokazuju ekvivalentnu najveću nominalnu rashladnu snagu bez obzira na režim rada rashladnog uređaja sa tečnim gasom, ispitivanja mogu biti uprošćena na režim rada sa jednim izvorom električne energije, uzimajući u obzir potencijalni uticaj na protok vazduha na izlazu iz isparivača, gde je primenljivo. Ekvivalentnost je dokazana ukoliko važi:

$$\frac{2 \cdot \left| P_{ном-макс,1} - P_{ном-макс,2} \right|}{P_{ном-макс,1} + P_{ном-макс,2}} \leq 0,035$$

gde je:
$P_{\text{nom-maks,1}}$ - Najveća nominalna snaga uređaja sa tečnim gasom za dati režim napajanja električnom energijom,
$P_{\text{nom-maks,2}}$ - Druga najveća nominalna snaga uređaja sa tečnim gasom za različit režim napajanja električnom energijom.

9.2.2 Određivanje najveće nominalne rashladne snage jedinice sa tečnim gasom

Ispitivanje treba da se sprovede na referentnim temperaturama od -20 °C i 0 °C.

Nominalna rashladna snaga na –10 °C treba da se računa pomoću linearne interpolacije snaga na –20 °C i 0 °C.

Najveća nominalna rashladna snaga regulacionog uređaja u jednotemperaturnom režimu treba da se meri sa najvećim nominalnim isparivačem ponuđenim od strane proizvođača. Ovaj isparivač je formiran na osnovu primarnog isparivača ili primarnih isparivača.

Ispitivanje treba da bude sprovedeno sa uređajem koja radi na jednoj referentnoj temperaturi, koja odgovara temperaturi na uvodnom otvoru za vazduh u slučaju provetravanih isparivača ili temperaturi vazduha unutar izotermičke komore u slučaju neprovetravanog isparivača.

Najveća nominalna rashladna snaga treba da bude određena na svakom temperaturnom nivou kao što sledi:

Prvo ispitivanje se sprovodi u trajanju od najmanje četiri sata pod kontrolom termostata rashladnog uređaja da bi se ustalilo prenošenje toplote između unutrašnjosti i spoljašnjosti kalorimetrijske kutije.

Nakon ponovnog punjenja rezervoara (po potrebi), sprovodi se drugo ispitivanje u trajanju od najmanje tri sata radi merenja najveće nominalne rashladne snage u kojem:

(a) Uređaj sa tečnim gasom treba podesiti na željenu temperaturu ispitivanja uz moguće izmene, ukoliko je potrebno, u skladu sa uputstvima naručioca ispitivanja.

(b) Električna energija rasuta u kalorimetrijskoj kutiji treba da bude prilagođena tokom ispitivanja kako bi se obezbedilo da referentna temperatura ostane konstantna.

Odstupanje rashladne snage tokom drugog ispitivanja treba da bude manje od pokretne srednje vrednosti od 5% po času i ne treba da bude veća od 10% tokom ovog ispitivanja. Ako je ovo slučaj, dobijena rashladna snaga odgovara najmanjoj rashladnoj snazi zabeleženoj tokom ovog ispitivanja.

Samo za merenje najveće nominalne rashladne snage uređaja sa tečnim gasom potrebno je sprovesti jedno dodatno ispitivanje u trajanju od jednog časa, sa najmanjim rezervoarom koji se prodaje uz uređaj da bi se kvantifikovao uticaj njegove zapremine na regulaciju rashladne snage. Nova dobijena rashladna snaga ne treba da odstupa više od 5% od donje vrednosti ili vrednosti dobijene sa rezervoarom korišćenim za ispitivanja u trajanju od tri sata ili više. Tamo gde je uticaj veći, smanjenje zapremine rezervoara treba da bude sadržano u zvaničnom izveštaju o ispitivanju.

9.2.3 Određivanje individualne rashladne snage svakog primarnog isparivača uređaja sa tečnim gasom

Individualna rashladna snaga svakog primarnog isparivača treba da bude merena u jednotemperaturnom režimu rada. Ispitivanje je potrebno sprovesti na –20 °C i 0 °C, kao što je opisano u tački 9.2.2.
Individualna rashladna snaga na –10 °C se računa pomoću linearne interpolacije snaga na –20 °C i 0 °C.

9.2.4 Određivanje preostale efektivne rashladne snage uređaja sa tečnim gasom u višetemperaturnom režimu rada na referentnom toplotnom opterećenju

Određivanje preostale efektivne snage rashladne jedinice sa tečnim gasom zahteva simultano korišćenje dva ili tri isparivača, kao što sledi:

(a) Za uređaj sa dva odeljka, isparivači sa najvišom i najnižom pojedinačnom rashladnom snagom.

(b) Za uređaj sa tri ili više odeljaka, isti isparivači kao iznad se koriste uz koliko god treba dodatnih isparivača, sa rashladnom snagom koja se nalazi između najviše i najniže rashladne snage.

Podešavanje referentnog toplotnog opterećenja:

(a) Podešavanja svih osim jednog isparivača treba da budu takva da se dobije temperatura vazduha na uvodnom otvoru od 0 °C, ili, ako nije primenljivo, temperatura vazduha unutar komore od 0 °C;

(b) Toplotno opterećenje treba da deluje na svaki par kalorimetar/isparivač pod kontrolom termostata, osim onog koji nije izabran;

(v) Toplotno opterećenje treba da bude jednako 20% pojedinačne rashladne snage na –20 °C svakog isparivača.

Efektivna snaga preostalih isparivača treba da bude određena na temperaturi vazduha na uvodnom otvoru, ili, ukoliko nije primenljivo, temperaturi vazduha unutar komore od –20 °C.

Kada je efektivna snaga preostalog isparivača određena, ispitivanje se ponavlja nakon kružne permutacije temperaturnih klasa.

9.3 Rashladna snaga isparivača

Rashladna snaga isparivača može biti određena na osnovu ispitivanja rashladne snage sprovedenih nad primarnim isparivačima. Rashladna snaga i potrošnja tečnog gasa isparivača jednake su aritmetičkom zbiru rashladne snage i potrošnje tečnog gasa primarnih isparivača unutar ograničenja najveće nominalne rashladne snage i pripadajućeg protoka tečnog gasa.

9.4 Dimenzionisanje i sertifikacija rashladnog višetemperaturnog transportnog sredstva sa tečnim gasom

Dimenzionisanje i sertifikacija rashladnog transportnog sredstva koje koristi rashladni uređaj sa tečnim gasom treba da se sprovode kao što je opisano u 3.2.6. za jednotemperaturno transportno sredstvo, sa sledećom ekvivalentnošću snaga:

$$P_{nom\text{-}ins} = P_{ef}$$ (efektivna rashladna snaga)

ili tačke 7.3. za višetemperaturno rashladno transportno sredstvo, sa sledećom ekvivalentnošću snaga:

$$P_{maks\text{-}nom} = P_{nominalno}$$

Dodatno, korisna zapremina rezervoara za tečni gas treba da bude takva da omogućuje da uređaj sa tečnim gasom može da održava temperaturu za predmetnu klasu transportnog sredstva u trajanju od najmanje 12 časova.

Prilog br. 1, Dodatak br. 3

A. Model obrasca sertifikata o saobraznosti transportnog sredstva propisanog u tački 3. Dodatka br. 1 Priloga br. 1

OBRAZAC SERTIFIKATA ZA IZOTERMIČKA, RASHLADNA, TRANSPORTNA SREDSTVA-HLADNjAČE, TRANSPORTNA SREDSTVA-HLADNjAČE SA MOGUĆNOŠĆU ZAGREVANjA ILI TRANSPORTNA SREDSTVA ZA ZAGREVANjE NAMENjENA ZA SUVOZEMNI MEĐUNARODNI PREVOZ LAKOKVARLjIVIH NAMIRNICA

Sertifikati o saobraznosti transportnog sredstva izdati pre 2. januara 2011. u skladu sa zahtevima koji se odnose na model sertifikata iz Dodatka br. 3 Priloga br.1, a koji su bili na snazi pre 1. januara 2011., ostaće važeći do isticanja njihovog izvornog roka važnosti.

Sertifikati o saobraznosti izdati pre datuma stupanja na snagu izmena tačke 3 modela sertifikata (30. septembar 2015.) ostaće važeći do isticanja njihovog originalnog roka važnosti.

ТРАНСПОРТНО СРЕДСТВО / EQUIPMENT[1]

SRB[2]	XXXXXXXXX[3]	*ИЗОТЕРМИЧКО* *INSULATED*	*РАСХЛАДНО* *REFRIGERATED*	*ХЛАДЊАЧА* *MECHANICALLY REFRIGERATED*	*ЗА ЗАГРЕВАЊЕ* *HEATED*	*ХЛАДЊАЧА СА ЗАГРЕВАЊЕМ* *MECHANICALLY REFRI-GERATED AND HEATED*	*ВИШЕТЕМПЕРАТУРНО* *MULTI-TEMPERATURE*

СЕРТИФИКАТ / CERTIFICATE[5] **АТР XXXXXXXXX**

Издат према Споразуму о међународном превозу лакокварљивих намирница и специјалним средствима за њихов превоз (АТП)
Issued pursuant to the Agreement on the International Carriage of Perishable Foodstuffs and on the Special Equipment to be Used for such Carriage (ATP)

1. *Орган који је издао сертификат / Issuing authority*: **XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX**
2. *Транспортно средство / Equipment*:[6] **XXXXXXXXXXXXXXXXXXXXX**
3. *Регистарска ознака / Registration number*:[a] **XXXXXXXXXX** *VIN / Vehicle identification number*:[a] **XXXXXXXXXXXXXXXXXXXXX**
додељена од / allotted by: **XXXXXXXXXXXXXXXXXXXXX**
Изотермичка комора / Insulated box: **МАРКА, ТИП, СЕРИЈСКИ БРОЈ И ГОДИНА ПРОИЗВОДЊЕ**[15]
4. *Власник или корисник / Owner or operated by*: **XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX**
5. *Подносилац захтева / Submitted by*: **XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX**
6. *Одобрено је као / Is approved as*:[7] **XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX**
6.1 *Са једним или више топлотних уређаја који су / With one or more thermal appliances which is (are)*:[1]
6.1.1 *Независни / Independent*;[8] **МАРКА, ТИП, РАСХЛАДНО СРЕДСТВО, СЕРИЈСКИ БРОЈ / ГОДИНА ПРОИЗВОДЊЕ (уколико постоји)**
6.1.2 *Зависни / Dependent*;[8] **МАРКА, ТИП, РАСХЛАДНО СРЕДСТВО, СЕРИЈСКИ БРОЈ / ГОДИНА ПРОИЗВОДЊЕ (уколико постоји)**
6.1.3 *Измењиви / Removable*;
6.1.4 *Неизмењиви / Not removable.*
7. *Основа за издавање сертификата / Basis of issue of certificate*:
7.1 *Овај сертификат се издаје на основу / This certificate is issued on the basis of*:[1]
7.1.1 *испитивања транспортног средства / tests of the equipment*;
7.1.2 *саобразности са репрезентом типа / conformity with a reference item of equipment*;
7.1.3 *периодичне контроле / a periodic inspection.*
7.2 *Навести / Specify:*
7.2.1 *Испитна станица / The testing station*: **XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX**
7.2.2 *Врста испитивања / The nature of the tests*:[9] **XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX**
7.2.3 *Број или бројеви извештаја о испитивању / The number(s) of the report(s)*:
ББББББББ (ИСПИТНА СТАНИЦА) ГГГГ/ММ/ДД и ББББББББ (ИСПИТНА СТАНИЦА) ГГГГ/ММ/ДД
7.2.4 *Вредност коефицијента К / The K coefficient*: **0.nn W/m²°C**
7.2.5 *Корисна расхладна снага при спољашњој температури од 30 °C и унутрашњој температури од / The effective refrigerating capacity at an outside temperature of 30 °C and an inside temperature of*:[10]

11	Номинална снага Nominal capacity	Исп.1 Evap.1		Исп. 2 Evap. 2	Исп. 3 Evap. 3
°C	xxxxx W	xxxxx W		xxxxx W	xxxxx W
°C	xxxxx W	xxxxx W		xxxxx W	xxxxx W
°C	xxxxx W	xxxxx W		xxxxx W	xxxxx W

7.3 *Број отвора и специјална опрема / Number of openings and special equipment* **X**
7.3.1 *Број врата / Number of doors*: **X** *задња врата / rear door*: **X** *бочна врата / side door(s)*: **X**
7.3.2 *Број отвора за проветравање / Number of vents*: **X**
7.3.3 *Опрема за вешање меса / Hanging meat equipment*: **X**
7.4 *Остало / Others*: **X**
8. *Овај сертификат важи до / This certificate is valid until*: **МЕСЕЦ И ГОДИНА**
8.1 *Под следећим условима / Provided that*:
8.1.1 *да се изотермичка комора и топлотни уређај (уколико постоји) одржавају у добром стању / The insulated body and, where applicable, the thermal appliance is maintained in good condition; and*
8.1.2 *да ниједна важна измена није учињена на топлотним уређајима / No material alteration is made to the thermal appliances*;
9. *Издат од / Done by*: **XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX**

ДУПЛИКАТ[12]
Не штампати на оригиналу сертификата
(Одговорно лице)
(Надлежни или овлашћени орган)

10. *На дан / On*: **ГГГГ/ММ/ДД**

ЛОГОТИП[13]
Сигурносни печат (рељефни, ултраљубичасти, итд.)
Оригинални документ
Original document

Надлежни орган / The competent authority
XXXXXXXXXXXXXXXXXXXXXXXXXX [14]
Одговоран за АТП / Responsible for the ATP

(Одговорно лице)

[a] *Није обавезујуће / Not mandatory*

Ove beleške se ne štampaju na sertifikatu.

[1] *Precrtati ono što se ne primenjuje.*

[2] *Znak zemlje koji se koristi u međunarodnom drumskom saobraćaju.*

[3] *Broj (cifre, slova, itd.) koji označava organ koji izdaje sertifikat i saopštenje o odobrenju.*

[4] *Postupak ispitivanja za novo višetemperaturno transportno sredstvo se nalazi u odeljku 7 Dodatka br. 2 Priloga br. 1. Postupak ispitivanja za višetemperaturno transportno sredstvo u upotrebi još nije ustanovljen. Višetemperaturno transportno sredstvo je izotermičko transportno sredstvo sa dva ili više odeljaka sa različitim temperaturama u svakom odeljku.*

[5] *Nepopunjen sertifikat se štampa na jeziku zemlje u kojoj se izdaje i na Engleskom, Francuskom ili Ruskom; različite stavke se numerišu kao u gornjem modelu.*

[6] *Navesti tip (vagon, kamion, prikolica, poluprikolica, kontejner, itd.); u slučaju transportnog sredstva-cisterne za prevoz tečnih namirnica, dodati reč „cisterna“.*

[7] *Ovde uneti jedan ili više opisa navedenih u Dodatku br. 4 Priloga br. 1, zajedno sa odgovarajućom oznakom ili oznakama za raspoznavanje.*

[8] *Navesti marku, tip, rashladnu tečnost, serijski broj i godinu proizvodnje uređaja.*

[9] *Merenje ukupnog koeficijenta prenosa toplote, određivanje efikasnosti rashladnih uređaja, itd.*

[10] *Ukoliko je određen u saglasnosti sa odredbama tačke 3.2 Dodatka br. 2 ovog priloga.*

[11] *Efektivna rashladna snaga svakog isparivača zavisi od broja isparivača povezanih na sklop kondenzatora.*

[12] *U slučaju gubitka, može se dobiti novi sertifikat ili, umesto njega, fotokopija ATP sertifikata koja ima specijalni pečat sa natpisom „DUPLIKAT“ (u crvenoj boji), ime odgovornog lica, njegov potpis i ime nadležnog ili ovlašćenog organa.*

[13] *Sigurnosni pečat (reljefni, fluorescentni, ultraljubičasti ili druga sigurnosna oznaka koja potvrđuje verodostojnost sertifikata).*

[14] *Ukoliko je primenljivo, navesti način na koji je delegiran organ koji izdaje ATP sertifikat.*

[15] *Napisati oznaku, model, serijski broj proizvođača i mesec i godinu proizvodnje izotermičke komore. Svi serijski brojevi izotermičkih transportnih sredstava (kontejnera) unutrašnje zapremine manje od 2 m^3 moraju biti navedeni. Takođe je prihvatljivo da se ovi brojevi navedu kolektivno, odnosno od broja ….. do broja …..*

B. Sertifikaciona tablica o saobraznosti transportnog sredstva, propisana u tački 3. Dodatka br. 1 Priloga br. 1

1. Sertifikaciona tablica treba da bude stalno učvršćena na transportnom sredstvu na jasno vidljivom mestu pored bilo koje druge tablice odobrenja izdate u službene svrhe. Tablica, u skladu sa dole prikazanim modelom, treba da ima oblik pravougaonika, da bude otporna na koroziju i vatru, širine najmanje 160 mm i visine najmanje 100 mm. Na tablici treba budu ispisane čitko i neizbrisivo, najmanje na Engleskom, Francuskom ili Ruskom jeziku, sledeće stavke:

   a) Latinična slova „ATP" iza kojih slede reči „ODOBRENO ZA PREVOZ LAKOKVARLjIVIH NAMIRNICA";

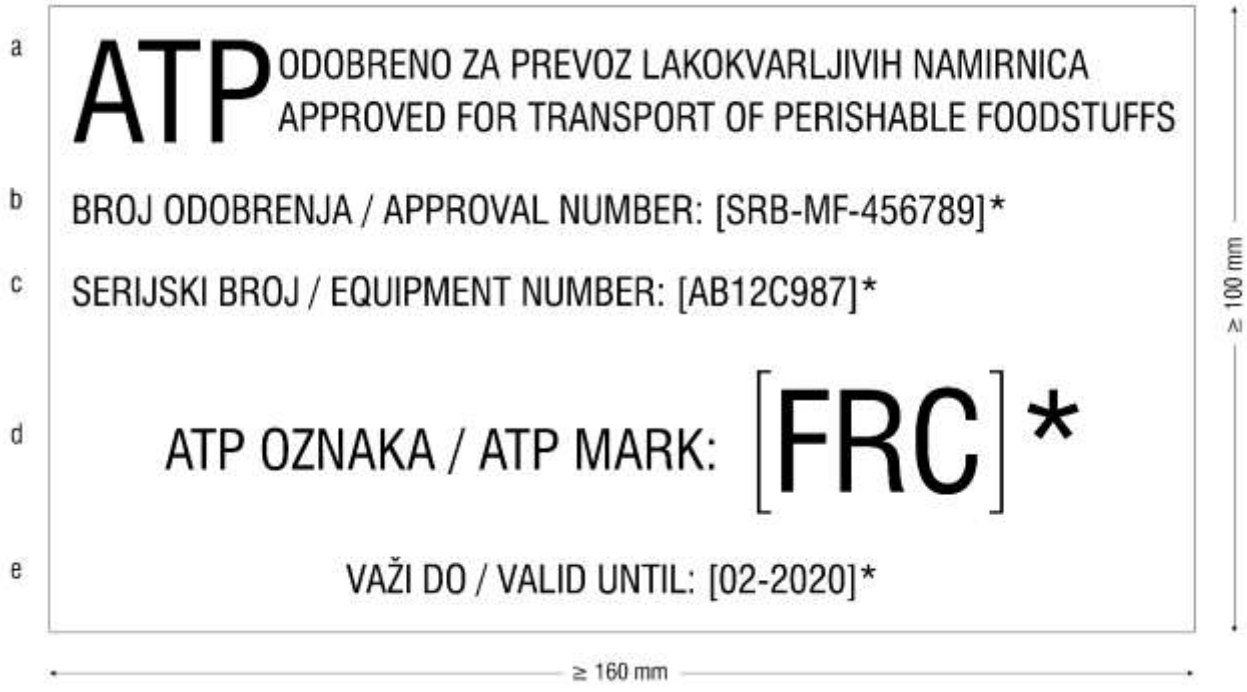
   b) „BROJ ODOBRENjA" praćeno karakterističnom oznakom (u međunarodnom drumskom saobraćaju) države u kojoj je dato odobrenje i brojem (cifre, slova, itd.) odobrenja;

   v) „SERIJSKI BROJ" praćeno zasebnim brojem dodeljenim za identifikaciju predmetnog transportnog sredstva (može biti proizvođačev broj);

   g) „ATP OZNAKA" praćeno karakterističnom oznakom propisanom u Dodatku br. 4 Priloga br. 1, koja odgovara klasi i kategoriji transportnog sredstva;

   d) „VAŽI DO" praćeno datumom (mesec i godina) isteka odobrenja transportnog sredstva. Ako je odobrenje obnovljeno posle ispitivanja ili provere, odgovarajući datum se može dodati u istom redu.

2. Slova „ATP" i slova karakteristične oznake treba da budu visoka približno 20 mm. Druga slova i cifre treba da budu visine ne manje od 5 mm.



* Podaci u zagradama su dati kao primer.

Prilog br. 1, Dodatak br. 4

OZNAKE ZA RASPOZNAVANjE KOJE TREBA STAVITI NA SPECIJALNA TRANSPORTNA SREDSTVA

Oznake za raspoznavanje propisane u tački 4. Dodatka br. 1 ovog priloga, pišu se velikim slovima, latinicom, tamno plave boje na beloj osnovi. Visina slova treba da bude najmanje 100 mm za oznake klase i najmanje 50 mm za datum isteka. U posebnim slučajevima, kao što je vozilo čija najveća dozvoljena masa ne prelazi 3,5 t, visina oznake klase može biti najmanje 50 m, odnosno 25 mm za datum isteka.

Oznaka klase i datum isteka treba da se postave najmanje na bočnim stranama u gornjem uglu blizu prednjeg kraja.

Oznake su sledeće:

Transportno sredstvo	Oznaka za raspoznavanje	
Obično izotermičko transportno sredstvo	IN	
Pojačano izotermičko transportno sredstvo	IR	
Obično rashladno transportno sredstvo klase A	RNA	
Pojačano rashladno transportno sredstvo klase A	RRA	
Pojačano rashladno transportno sredstvo klase B	RRB	
Pojačano rashladno transportno sredstvo klase C	RRC	
Obično rashladno transportno sredstvo klase D	RND	
Pojačano rashladno transportno sredstvo klase D	RRD	
Obično transportno sredstvo-hladnjača klase A	FNA	
Pojačano transportno sredstvo-hladnjača klase A	FRA	
Pojačano transportno sredstvo-hladnjača klase B	FRB	
Pojačano transportno sredstvo-hladnjača klase C	FRC	
Obično transportno sredstvo-hladnjača klase D	FND	
Pojačano transportno sredstvo-hladnjača klase D	FRD	
Pojačano transportno sredstvo-hladnjača klase E	FRE	
Pojačano transportno sredstvo-hladnjača klase F	FRF	
Obično transportno sredstvo za zagrevanje klase A	CNA	
Pojačano transportno sredstvo za zagrevanje klase A		CRA
Pojačano transportno sredstvo za zagrevanje klase B		CRB
Pojačano transportno sredstvo za zagrevanje klase C		CRC
Pojačano transportno sredstvo za zagrevanje klase D		CRD
Obično transportno sredstvo-hladnjača sa mogućnošću zagrevanja klase A		BNA
Pojačano transportno sredstvo-hladnjača sa mogućnošću zagrevanja klase A	BRA	
Pojačano transportno sredstvo-hladnjača sa mogućnošću zagrevanja klase B	BRB	
Pojačano transportno sredstvo-hladnjača sa mogućnošću zagrevanja klase C	BRC	
Pojačano transportno sredstvo-hladnjača sa mogućnošću zagrevanja klase D	BRD	
Pojačano transportno sredstvo-hladnjača sa mogućnošću zagrevanja klase E	BRE	
Pojačano transportno sredstvo-hladnjača sa mogućnošću zagrevanja klase F	BRF	
Pojačano transportno sredstvo-hladnjača sa mogućnošću zagrevanja klase G	BRG	
Pojačano transportno sredstvo-hladnjača sa mogućnošću zagrevanja klase H	BRH	
Pojačano transportno sredstvo-hladnjača sa mogućnošću zagrevanja klase I		BRI
Pojačano transportno sredstvo-hladnjača sa mogućnošću zagrevanja klase J	BRJ	
Pojačano transportno sredstvo-hladnjača sa mogućnošću zagrevanja klase K	BRK	
Pojačano transportno sredstvo-hladnjača sa mogućnošću zagrevanja klase L	BRL	

U slučaju drumskog transportnog sredstva sa više odeljaka koje je podeljeno na dva odeljka, oznaka klase se sastoji iz oznaka za svaki odeljak (na primer FRC-FRA) i počinje sa odeljkom koji je napred ili sa leve strane transportnog sredstva.

Za ostala transportna sredstva sa više odeljaka, oznaka se bira samo za najveću klasu po ATP sporazumu, odnosno klasu koja dopušta najveću razliku između temperatura unutar i van transportnog sredstva, te se dopunjava slovom M (na primer FRC-M).

Ovakvo označavanje je obavezno za sva transportna sredstva proizvedena od 1. oktobra 2020.

Ako je transportno sredstvo snabdeveno izmenjivim ili zavisnim toplotnim uređajem i ako postoje posebni uslovi za upotrebu toplotnog uređaja, slovne oznake za raspoznavanje biće dopunjene latiničnim slovom X u sledećim slučajevima:

1. U SLUČAJU RASHLADNOG TRANSPORTNOG SREDSTVA:

   Ukoliko eutektičke ploče treba postaviti u drugu komoru radi zaleđivanja;

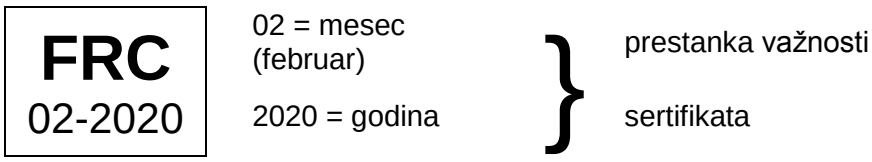
2. U SLUČAJU TRANSPORTNOG SREDSTVA-HLADNjAČE I TRANSPORTNOG SREDSTVA-HLADNjAČE SA MOGUĆNOŠĆU ZAGREVANjA:

   2.1 Ukoliko je kompresor pogonjen motorom vozila;

   2.2 Ukoliko je rashladni uređaj, odnosno uređaj za hlađenje i zagrevanje, ili njegov deo izmenjiv, što bi sprečilo njegovo funkcionisanje.

   Datum (mesec, godina) naveden u odeljku A, stavka 8 u Dodatku br. 3 ovog priloga kao datum prestanka važnosti sertifikata izdatog za transportno sredstvo treba da bude naznačen ispod gorepomenutih oznaka za raspoznavanje.

   Model:



Prilog br. 2

IZBOR TRANSPORTNIH SREDSTAVA I TEMPERATURNIH USLOVA ZA PREVOZ DUBOKO SMRZNUTIH I SMRZNUTIH NAMIRNICA

1. Za prevoz sledećih duboko smrznutih i smrznutih namirnica, transportno sredstvo treba izabrati i koristiti na taj način da za vreme prevoza najviša temperatura namirnica u bilo kojoj tački tereta ne pređe naznačenu temperaturu.

   Zbog toga transportno sredstvo koje se koristi za transport duboko smrznutih namirnica treba da bude opremljeno uređajem navedenim u Dodatku br. 1 ovog priloga. Međutim, ukoliko se pristupi proveri temperature namirnica, to se mora učiniti u skladu sa postupkom navedenim u Dodatku br. 2 ovom priloga.

2. Prema tome, temperatura namirnica u bilo kojoj tački tereta mora da bude na ili ispod navedene vrednosti pri utovaru, za vreme prevoza i pri istovaru.

3. Kada je potrebno otvoriti transportno sredstvo, na primer zbog inspekcije, nužno je obezbediti da namirnice ne budu izložene postupcima ili uslovima koji su u suprotnosti sa ciljevima ovog priloga i onima iz Međunarodne konvencije o harmonizaciji kontrole dobara na granici.

4. Za vreme određenih operacija, kao što je odmrzavanje isparivača transportnih sredstava-hladnjača, dozvoljava se kratkotrajno povećanje temperature površine namirnica za ne više od 3 ˚C u delu tovara, na primer blizu isparivača, iznad odgovarajuće temperature.

   Sladoled ..... –20 ˚C

   Smrznuta ili duboko smrznuta riba, riblji proizvodi, mekušci, ljuskari i sve druge duboko smrznute namirnice ..... –18 ˚C

   Sve ostale smrznute namirnice (osim maslaca) ..... –12 ˚C

   Maslac ..... –10 ˚C

   Dolenavedene duboko smrznute i smrznute namirnice koje se moraju dalje obraditi neposredno po dolasku na odredište:[1]

   Maslac
   Koncentrisani voćni sok

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1 Za navedene duboko smrznute i smrznute namirnice namenjene za dalju obradu neposredno po dolasku na odredište, može se dozvoliti postepeno povećanje temperature za vreme prevoza tako da po dolasku na odredište temperature ne budu veće od onih koje je odredio pošiljalac i koje su navedene u ugovoru o prevozu. Ta temperatura ne treba da bude veća od najveće temperature odobrene za istu namirnicu kada se hladi kako je opisano u Prilogu br. 3. Isprave o ovakvom prevozu treba da sadrže ime namirnice, da li je duboko smrznuta ili smrznuta i da će neposredno po dolasku na odredište biti dalje obrađena. Ovaj prevoz biće obavljen ATP odobrenim transportnim sredstvom bez korišćenja toplotnih uređaja za povećanje temperatura namirnica.

Prilog br. 2, Dodatak br. 1

PRAĆENjE TEMPERATURE VAZDUHA KOD TRANSPORTA DUBOKO SMRZNUTIH LAKOKVARLjIVIH NAMIRNICA

Transportno sredstvo mora biti opremljeno instrumentom sposobnim za merenje i snimanje temperatura vazduha i čuvanje pribavljenih podataka (u daljem tekstu instrument) kako bi se pratile temperature vazduha kojem su izložene duboko smrznute namirnice namenjene za ljudsku upotrebu.

Instrument mora biti odobren u skladu sa standardom EN 13486:2022 od strane akreditovanog tela i dokumentacija mora biti na raspolaganju za odobrenje nadležnih ATP organa.

Instrumenti moraju biti u saglasnosti sa standardom EN 12830:2018.

Pisači temperature u upotrebi koji su u saglasnosti sa standardom 12830:1999 se mogu zadržati u upotrebi.

Zapisi temperatura dobijeni na ovaj način moraju biti datirani i korisnik ih mora čuvati najmanje godinu dana ili duže, u zavisnosti od vrste hrane.

Prilog br. 2, Dodatak br. 2

POSTUPAK ZA UZORKOVANjE I MERENjE TEMPERATURE KOD PREVOZA RASHLAĐENIH, SMRZNUTIH I DUBOKO SMRZNUTIH LAKOKVARLjIVIH NAMIRNICA

A. OPŠTA RAZMATRANjA

1. Kontrola i merenje temperatura utvrđeni u Prilozima br. 2 i 3 treba da budu obavljeni tako da namirnice ne budu izložene uslovima štetnim za bezbednost ili kvalitet namirnica. Merenje temperature hrane treba da bude obavljeno u rashlađenoj okolini, i sa najmanjim mogućim kašnjenjem i ometanjem operacija prevoza.

2. Postupke kontrole i merenja, kao što je navedeno u tački 1, prvenstveno treba obavljati na mestima utovara ili istovara. Ove postupke uobičajeno ne treba sprovoditi u toku prevoza, sve dok ne postoji ozbiljna sumnja u saobraznost temperatura namirnica utvrđenih u Prilozima br. 2 i 3.

3. Kada je to moguće, kontrola treba da uzme u obzir informacije dobijene od uređaja za praćenje temperature u toku putovanja pre izbora datog tovara lakokvarljivih namirnica za uzorkovanje i postupke merenja. Prelazak na merenje temperature hrane treba izvršiti samo ako postoji ozbiljna sumnja u upravljanje temperaturom za vreme prevoza.

4. Kada se izabere tovar, prvo treba primeniti merenje bez razaranja (između kutija ili između pakovanja). Samo ako rezultati merenja bez razaranja nisu saglasni sa temperaturama navedenim u Prilozima br. 2 ili 3 (uzimajući u obzir dozvoljena odstupanja), treba primeniti merenje sa razaranjem. Kada su pošiljke ili kutije otvorene zbog kontrole, ali nisu preduzeta nikakva druga dejstva, treba ih zatvoriti i označiti podacima o danu, času i mestu kontrole i zvaničnim pečatom kontrolnog organa.

B. UZORKOVANjE

5. Tipovi izabrane ambalaže za merenje temperature treba da budu takvi da je njihova temperatura predstavnik najtoplije tačke pošiljke.

6. Kada je potrebno da se izaberu uzorci za vreme prevoza dok je pošiljka utovarena, dva uzorka treba da budu uzeta sa vrha i dna pošiljke blizu ivice otvaranja svakih vrata ili para vrata.

7. Kada se uzorci uzimaju za vreme istovara pošiljke, po četiri uzorka treba da budu izabrana na sledećim mestima:
   - vrh i dno pošiljke blizu ivice otvaranja vrata;
   - gornji zadnji uglovi pošiljke (tj. najudaljeniji od rashladnog uređaja);
   - centar pošiljke;
   - centar prednje površine pošiljke (tj. najbliže rashladnom uređaju);
   - gornji ili donji uglovi prednje površine pošiljke (tj. najbliže ulasku povratnog vazduha iz rashladnog uređaja).

8. U slučaju rashlađene hrane o kojoj je reč u Prilogu br. 3, uzorci se uzimaju i sa najhladnijeg mesta kako bi se osiguralo da nije došlo do smrzavanja za vreme transporta.

V. MERENjE TEMPERATURE LAKOKVARLjIVIH NAMIRNICA

9. Sondu za merenje temperature pre merenja treba ohladiti na temperaturu što bližu temperaturi proizvoda.

I. Rashlađena hrana

10. Merenje bez razaranja. Merenje između kutija ili između pakovanja treba da se obavi pljosnatom sondom, koja obezbeđuje dobar površinski kontakt, ima malu toplotnu masu i visoku toplotnu provodljivost. Kada se sonda postavlja između kutija ili pakovanja hrane, treba postojati dovoljan pritisak kako bi se dobio dobar toplotni kontakt, i dovoljna dužina sonde da bi se smanjile greške provodljivosti.

11. Merenje sa razaranjem. Treba koristiti sondu sa krutim robusnim telom i oštrim vrhom, izrađenu od materijala koji se može lako čistiti i dezinfikovati. Sondu treba umetnuti u središte pakovanja hrane, i zabeležiti temperaturu kada se ustali.

II. Smrznuta i duboko smrznuta hrana

12. Merenje bez razaranja. Isto kao u tački 10.

13. Merenje sa razaranjem. Temperaturne sonde nisu konstruisane za prodiranje u smrznutu hranu. Zbog toga je potrebno napraviti rupu u proizvodu u koju će se umetnuti sonda. Rupa se buši prethodno ohlađenim probojnim instrumentom - metalni instrument sa oštrim vrhom kao što je probojac za led, ručna bušilica ili svrdlo. Prečnik rupe treba da omogući blizak kontakt sa sondom. Dubina rupe u koju se uvlači sonda zavisi od tipa proizvoda:

    (i) Kada dimenzije proizvoda dozvoljavaju, sondu umetnuti do dubine od 2,5 cm od površine proizvoda;

    (ii) Kada veličina proizvoda ne dozvoljava postupak opisan pod (i), sondu treba uvući najmanje do dubine koja je 3 do 4 puta veća od prečnika sonde;

    (iii) Nije moguće ili praktično napraviti rupu u nekim vrstama hrane zbog njihove veličine ili oblika (povrće isečeno na kocke npr.). U tim slučajevima unutrašnja temperatura pakovanja hrane se određuje umetanjem pogodne sonde sa oštrim vrhom u centar pakovanja kako bi se izmerila temperatura u dodiru sa hranom.

Posle umetanja sonde, temperatura se očitava nakon njenog ustaljenja.

G. OPŠTI KRITERIJUMI ZA MERNI SISTEM

14. Merni sistem (sonda i pokazivač) koji se koristi za određivanje temperature treba da zadovolji sledeće kriterijume:

    (i) vreme odziva treba da bude takvo da omogući registrovanje 90% od razlike između početnog i konačnog očitavanja u periodu od tri minuta;

    (ii) sistem treba da ima tačnost od ± 0,5 ˚C u mernom opsegu od – 20 ˚C do + 30 ˚C;[1]

    (iii) tačnost merenja ne sme da se promeni za više od 0,3 ˚C za vreme rada u temperaturnom opsegu okoline od – 20 ˚C do + 30 ˚C; [1]

    (iv) rezolucija očitavanja instrumenta treba da bude 0,1 ˚C;

    (v) tačnost sistema treba redovno proveravati; [1]

(vi) sistem treba da poseduje važeće uverenje o etaloniranju izdato od ovlašćene institucije;

(vii) električne komponente sistema treba da budu zaštićene od neželjenih efekata usled kondenzacije vlage;

(viii) sistem treba da bude robustan i otporan na udar.

D. DOZVOLjENA ODSTUPANjA PRI MERENjU TEMPERATURE

15. Određena odstupanja treba da budu dozvoljena u tumačenju temperaturnih merenja:

(i) operaciona – u slučaju smrznute i duboko smrznute hrane, kratki porast od 3 ˚C u odnosu na temperaturu dozvoljenu u Prilogu br. 2 je dozvoljen za površinsku temperaturu hrane;

(ii) metodološka – merenje bez razaranja može da dâ najviše do 2 ˚C razlike u očitavanju u poređenju sa stvarnom temperaturom, naročito zbog debljine kartona za pakovanje. Ova odstupanja se ne odnose na metode merenja temperature sa razaranjem.

[1] *Postupak će biti određen.*

Prilog br. 3

IZBOR TRANSPORTNIH SREDSTAVA I TEMPERATURNIH USLOVA ZA PREVOZ RASHLAĐENIH NAMIRNICA

1. Za prevoz sledećih rashlađenih namirnica, transportno sredstvo treba izabrati i koristiti na taj način da za vreme prevoza najviša temperatura u bilo kojoj tački tereta ne pređe naznačenu temperaturu. Međutim, ukoliko se pristupi proveri temperature namirnice, to se mora učiniti u skladu sa postupkom navedenim u Dodatku br. 2 Priloga br. 2 ovog Sporazuma.

2. Prema tome, temperatura namirnica u bilo kojoj tački tereta mora da bude na ili ispod navedene vrednosti pri utovaru, za vreme prevoza i pri istovaru.

3. Kada je potrebno otvoriti transportno sredstvo, na primer zbog inspekcije, nužno je obezbediti da namirnice ne budu izložene postupcima ili uslovima koji su u suprotnosti sa ciljevima ovog priloga i onima iz Međunarodne konvencije o harmonizaciji kontrole dobara na granici.

4. Kontrola temperature namirnica naznačenih u ovom prilogu treba da bude takva da ne izazove smrzavanje u bilo kojoj tački tereta.

		Maksimalna temperatura
I.	Sirovo mleko[1]	+ 6 ˚C
II.	Crveno meso[2] i krupna divljač (osim crvenih iznutrica)	+ 7 ˚C
III.	Proizvodi od mesa[3], pasterizovano mleko, sveži mlečni proizvodi (jogurt, kefir, pavlaka i svež sir[4]), gotova jela (meso, riba, povrće), sirovo povrće spremno za jelo, proizvodi od povrća[5], koncentrisani voćni sok i riblji proizvodi[3] koji nisu navedeni dole	ili na +6 ˚C ili na temperaturi naznačenoj na etiketi i/ili u ispravi o prevozu
IV.	Divljač (osim krupne divljači), živina[2] i zečevi	+ 4 ˚C
V.	Crvene iznutrice[2]	+ 3 ˚C
VI.	Mleveno meso[2]	ili na +2 ˚C ili na temperaturi naznačenoj na etiketi i/ili u ispravi o prevozu
VII.	Sirova riba, mekušci i Ljuskari[6]	na ledu koji se topi ili na temperaturi topljenja leda

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1 *Kada se mleko sakuplja sa farmi za neposrednu preradu, za vreme prevoza temperatura može da poraste do +10 ˚C.*

2 *Pripremljeno na bilo koji način.*

3 *Izuzev za proizvode potpuno obrađene soljenjem, dimljenjem, sušenjem ili sterilizacijom.*

4 *Pod „svežim sirom" se podrazumeva nezreo sir koji je spreman za konzumiranje ubrzo posle proizvodnje i koji ima ograničen period konzervacije.*

5 *Sirovo povrće koje je iseckano na kocke ili kriške ili mu je na drugi način smanjena veličina, ali izuzev onog koje je samo oprano, oljušteno ili isečeno na polovine.*

6 *Izuzev žive ribe, živih mekušaca i živih ljuskara.*

Član 3.

O prihvatanju izmena i dopuna tehničkih propisa koji su sastavni deo Sporazuma o međunarodnom prevozu lakokvarljivih namirnica i specijalnim sredstvima za njihov prevoz (ATP) i njihovoj primeni u Republici Srbiji odlučuje Vlada.

O objavljivanju tehničkih propisa iz stava 1. ovog člana stara se ministarstvo nadležno za poslove saobraćaja.

Član 4.

Ovaj zakon stupa na snagu osmog dana od dana objavljivanja u „Službenom glasniku RS – Međunarodni ugovori”.