



SLOVENSKI STANDARD
SIST EN 17066-1:2019

01-oktober-2019

Izolirana transportna sredstva za toplotno občutljivo blago - Zahteve in preskušanje - 1. del: Kontejner

Insulated means of transport for temperature sensitive goods - Requirements and testing - Part 1: Container

Wärme gedämmte Transportmittel für temperaturempfindliche Produkte - Anforderungen und Prüfung - Teil 1: Container

Moyen de transport isotherme pour les marchandises sensibles à la température - Exigences et essais - Partie 1: Cellule isotherme

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Ta slovenski standard je istoveten z: EN 17066-1:2019

ICS:

27.200	Hladilna tehnologija	Refrigerating technology
55.180.10	Večnamenski kontejnerji	General purpose containers

SIST EN 17066-1:2019

en,fr,de

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EUROPEAN STANDARD

EN 17066-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2019

ICS 27.200; 55.180.10

English Version

Insulated means of transport for temperature sensitive goods - Requirements and testing - Part 1: Container

Moyen de transport isotherme pour les marchandises sensibles à la température - Exigences et essais - Partie 1 : Cellule isotherme

Wärmegeämmte Transportmittel für temperaturempfindliche Produkte - Anforderungen und Prüfung - Teil 1: Container

This European Standard was approved by CEN on 19 May 2019.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 17066-1:2019) has been prepared by Technical Committee CEN/TC 413 “Insulated means of transport for temperature sensitive goods with or without cooling and/or heating device”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2020, and conflicting national standards shall be withdrawn at the latest by January 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

The European Standard EN 17066, *Insulated means of transport for temperature sensitive goods — Requirements and testing*, consist of the following parts:

- *Part 1: Container*;
- *Part 2: Equipment*¹;
- *Part 3: Small containers*¹.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

¹ Under preparation.

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1 Scope

This document applies to all thermally insulated means of transport, including: trucks, trailers, tanks, vans, wagons, containers for land transport, small containers, packaging. It is related to every type of insulation. If certain temperatures are due to be maintained independently of external conditions, the above means of transport could be additionally provided with a cooling and/or heating device.

This document specifies the terminology, the requirements for thermal insulation, air tightness, test provisions, dimensioning of containers with and without cooling and/or heating device.

This document also specifies the test provisions for new and in service equipment(s).

This document specifies the terminology, the requirements for thermal insulation, air tightness, test provisions for K-value. This document does not specify further land transport requirements with regard to dimensions, weights, etc. This document does not cover safety requirements. This document does not specify special requirements for sea containers covered by ISO 1496-2.

2 Normative references

There are no normative references in this document.

3 Terms, definitions, symbols and uncertainties

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://standards.iteh.ai/catalog/standards/sist/f8de6518-9379-4b9e-8bcd->
able at <http://www.iso.org/obp>

3.1.1 General

3.1.1.1

goods

temperature-sensitive products to be transported within a defined temperature range

3.1.1.2

van

light commercial vehicle with integrated insulation for the transport of goods, of which the occupant compartment and the load space are thermally separated from the driver's cabin

Note 1 to entry: This is not applicable to vans with inserted insulated container fixed or removable.

3.1.1.3

container

insulated bodywork or vessel built for the carriage of the goods intended to be or not be equipped with a cooling and/or heating device, including tanks, bodywork for trucks or trailers, swap bodies, railway wagons, integrated insulation body work for vans, small containers

3.1.1.4**small container**

non-stationary reusable container with an internal volume inclusive for $0,02 \leq V_i \leq 2,00 \text{ m}^3$ used for the storage and the transport of the goods and equipped or not equipped with a cooling and/or heating device

Note 1 to entry: A small container is built either as bodywork or from a completely moulded structure and can be fitted optionally with wheels or fork lift pockets or lifting lugs or handles.

3.1.1.5**tank**

road tank vehicle, rail tank, tank container or tank swap body, all being insulated, intended to transport liquid or granulated or powdered goods

3.1.1.6**compartment**

tight part of a container built for the carriage of the goods equipped or not with a cooling and/or heating device

3.1.1.7**body kit**

complete set of parts to build container, delivered in a non-assembled form, consisting of parts such as side walls, roof, floor, wheel boxes, front end and rear end including closure type and/or door(s), as well as their means of connection

3.1.1.8**insulation kit**

set of shaped insulating panels specifically designed to cover the inside of a particular van model delivered in a non-assembled form, consisting of parts such as side walls, roof, floor, wheel boxes if any, front end and rear end, as well as their means of connection to build a container

3.1.1.9**covering**

part of the insulation panel, which is the self-supporting material covering the internal and/or external surface of the insulation panel

3.1.1.10**equipment**

container equipped with a cooling and/or heating device

3.1.1.11**insulated packaging**

material used to contain goods to protect them from temperature variation

3.1.2 Dimensions**3.1.2.1****load space**

volume inside a container or a compartment available for loading the goods including any required accessories (i.e. shelves, meat rails, etc.)

EN 17066-1:2019 (E)**3.1.2.2****inner volume** V_i

total inner volume, in m³, of a container or a compartment including load space and space for air circulation

3.1.2.3**projected internal surface area of the container** S_i

surface area determined by taking into consideration the projected internal surface areas of specific design features of the equipment or irregularities of its surface such as curves, corrugations, wheel arches, etc.

3.1.2.4**projected external surface area of the container** S_e

surface area determined by taking into consideration the projected external surface areas of specific design features of the equipment or irregularities of its surface such as curves, corrugations, wheel arches, etc.

3.1.2.5**mean surface area** S_m

geometrical mean of the projected internal surface area S_i and the projected external surface area S_e , in m²

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

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(1)

3.1.3 Temperatures and K-value**3.1.3.1****mean internal temperature** T_i

arithmetic mean of all the temperatures measured inside the container/packaging

Note 1 to entry: The number and the position of the temperature sensors are defined in Table 2.

3.1.3.2**mean external temperature** T_e

arithmetic mean of all the temperatures measured outside the container/packaging

Note 1 to entry: The number and the position of the temperature sensors are defined in Table 2.

3.1.3.3**mean wall temperature** T_w arithmetic mean of the mean external temperature T_e and the mean internal temperature T_i

$$T_w = \frac{T_e + T_i}{2} \quad \text{in } ^\circ\text{C} \quad (2)$$

3.1.3.4**temperature difference** ΔT difference between the mean internal temperature T_i and the mean external temperature T_e

$$\Delta T = T_i - T_e \quad \text{in K} \quad (3)$$

3.1.3.5**heat load** P_{HL}

heating power delivered into the container by electrical heating elements and their fans during the determination of the K-value

3.1.3.6**K-value**

overall heat transfer coefficient K which is calculated using the following formula:

$$K = \frac{P_{HL}}{S_m \cdot \Delta T} \quad \text{in W}/(\text{m}^2 \cdot \text{K}) \quad (4)$$

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where

 P_{HL} is the total heat load, required in the steady-state condition to maintain a constant temperature difference ΔT , in W; ΔT is the temperature difference between the mean external temperature T_e and the mean internal temperature T_i of a container having a mean surface area S_m , in K; T_e mean external temperature, in $^\circ\text{C}$; T_i mean internal temperature, in $^\circ\text{C}$; S_m mean surface area, in m^2 .

Note 1 to entry: The overall heat transfer coefficient taking into account thermal losses through all outer boundaries, thermal bridges and air leakage.

3.1.4 Testing**3.1.4.1****conditioned test room**

room where the test conditions can be maintained at a constant level

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3.1.4.2

steady-state conditions

test operation in which the measured values remain within the specified ranges and without any permanent tendency during the defined time period

3.2 Symbols and uncertainties

The requirements regarding maximal measurement uncertainties or calculation are given in Table 1:

Table 1 — Symbols and uncertainties

Symbol	Measured quantity	Unit	Uncertainties
L_1	linear dimension < 0,050 m	m	±0,2 mm
L_2	linear dimension: 0,050 m ≤ x ≤ 1 m	m	±2 mm
L_3	linear dimensions > 1 m	m	±0,2 %
P_{HL}	heat load	W	±1 %
S_i	projected internal surface area of the equipment	m ²	±1,5 %
S_e	projected external surface area of the equipment	m ²	±1,5 %
S_m	mean surface area for containers except vans or small containers	m ²	±1,5 %
	mean surface area for vans or small containers	m ²	±2 %
T_i	mean internal temperature	°C	±0,5 K
T_e	mean external temperature	°C	±0,5 K
T_W	mean wall temperature	°C	±0,5 K
ΔT	temperature difference	K	±0,5 K
K	K -value	W/(m ² ·K)	±5 %
<p>NOTE 1 The uncertainties are either the maximal measurement uncertainties for the measured quantity or the uncertainties of the determination of quantities when those are calculated. All uncertainties are given with a coverage factor equal to 2.</p> <p>NOTE 2 The linear dimensions L_1, L_2, L_3 apply to the following symbols used in Figure D.1: W, H, L, l, a, b, c.</p>			

4 Requirements for containers and kits**4.1 General**

All containers shall be designed in order to reach the relevant K -value for its application.

4.2 Materials and components

The materials shall be durable and shall not encourage the development of mould or emit odours.

Internal and external coverings shall be resistant to wear and capable of being cleaned effectively and hygienically. They shall not crack, chip, flake, rub off or soften under normal conditions of use or during

cleaning. Detergents and disinfectants, cleaning and disinfection procedures, recommended by the equipment manufacturer, shall be used.

Metal parts, used in the construction of equipment, shall have resistance to corrosion appropriate to their location and function.

Internal and external coverings and insulation shall be resistant to temperature ranges intended to be applied.

When the container is intended to be loaded with unpacked goods, the internal covering materials and articles shall comply with further requirements for materials and articles intended to come into contact with goods, if applicable.

The materials shall be resistant to moisture and shall neither be toxic nor contaminate the foodstuff.

Safety devices already integrated in the vehicle (for example: inside unlocking of doors, exit aids) shall not be interfered by fitting of the insulation to the load space.

4.3 Thermal insulation

4.3.1 General

When selecting the insulating material, it shall be ensured that it:

- is odourless and resistant to uptake of odours;
- shows only moisture absorption that the selected layer material allows;
- is decay-resistant;
- shows dimensional stability in the temperature range from -40°C to $+80^{\circ}\text{C}$ and has sufficient strength and dimensional stability for all intended ranges of application;
- has a good thermal insulation with low ageing properties.

NOTE For reasons of energy savings, maintaining the temperature of the goods during transport and operational costs, the level of insulation of the container could take into account:

- the temperature difference between inside and outside temperature ranges which is intended to be met during use of the container;
- the optimization of Europallet transport.

For energy savings of the cooling and/or heating devices only, not including traction energy consumption, it is strongly recommended to choose a K -value with the following formula:

$$K \leq \frac{20}{(T_e - T_i)} \quad (5)$$

4.3.2 Seals

The doors or other openings and their frames shall be provided with sufficient seal.

When selecting the seals, it shall be ensured that:

- they are fully serviceable at temperatures between -40°C and $+80^{\circ}\text{C}$;
- they shall be fitted in a way that they can be replaced;