



SLOVENSKI STANDARD
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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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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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prEN 17066-1:2016 (E)

European foreword

This document (prEN 17066-1:2016) has been prepared by 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 document is currently submitted to the CEN Enquiry.

The series of standards consist of the following parts:

- Part 1: Container
- Part 2: Equipment
- Part 3: Small containers

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1 Scope

This European Standard applies to thermally insulated means of transport used for temperature sensitive goods in order to limit the heat exchange to the external conditions. If certain temperatures have to be maintained, the above means of transport could be additionally provided with a cooling and/or heating device.

This standard specifies the terminology, the requirements for thermal insulation, air tightness, test provisions, dimensioning of equipment with cooling and/or heating device.

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

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 60751, *Industrial platinum resistance thermometers and platinum temperature sensors (IEC 60751)*

3 Terms, definitions, symbols and uncertainties

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

3.1 General

3.1.1 <https://standards.iteh.ai/catalog/standards/sist/f8de6518-9379-4b9e-8bcd-c2b967c7fd96/sist-en-17066-1-2019>
goods
 temperature sensitive products to be transported within a defined temperature range

3.1.2

van

vehicle for the transport of goods, of which the occupant compartment and the load space are within a single unit (ISO 27956), or car based vehicle, which has been modified for commercial purpose into a small van, where the original load space is thermally insulated

3.1.3

container

insulated bodywork or vessel built for the carriage of the goods intended to be or not 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

3.1.4

small container

non-stationary reusable container with an internal volume inclusive between 0,02 and 2,00 m³ used for the storage and the transport of the goods equipped or not 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.

prEN 17066-1:2016 (E)**3.1.5****tank**

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

3.1.6**compartment**

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

3.1.7**body kit**

complete set of parts to build an insulated container, delivered in a non-assembled form, consisting of parts such as side walls, roof, floor, wheel boxes, front end and rear end, as well as their means of connection

3.1.8**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

3.1.9**covering**

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

3.1.10**equipment**

container equipped with a cooling and/or heating device

3.2 Dimensions**3.2.1****load space**

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

3.2.2**inner volume**

V_i

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

3.2.3**projected internal surface area of the container**

S_i

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

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

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

3.2.5**mean surface area** S_m

geometrical mean of the internal surface area S_i and the external surface area S_e in m^2

$$S_m = \sqrt{S_i \cdot S_e} \quad (1)$$

3.3 Temperatures and K-value**3.3.1****mean internal temperature** T_i

arithmetic mean of all the temperatures measured at the same time inside the equipment

3.3.2**mean external temperature** T_e

arithmetic mean of all the temperatures measured at the outside the equipment

Note 1 to entry: The number and the position are defined in the specific parts.

3.3.3**mean wall temperature** T_w

arithmetic mean of the mean external temperature T_e and the mean internal temperature T_i

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

3.3.4**temperature difference ΔT**

difference between the mean internal temperature T_i and the mean external temperature T_e

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

3.3.5**K-value**

overall heat transfer coefficient which is calculated using the following equation

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

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where PHL is the total heat load, in W, required in the steady-state condition to maintain a constant temperature difference ΔT in K, between the mean external temperature T_e and the mean internal temperature T_i of an equipment having a mean surface area S_m in m^2

Note 1 to entry: Heat transfer coefficient taking into account thermal losses through insulation, air leakage and thermal losses through thermal bridges created by the partition wall itself and by the inner skin of the equipment panels, including walls, floor and roof.

3.4 Testing

3.4.1

conditioned test room

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

3.4.2

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

3.5 Symbols and uncertainties

Table 1 — Symbols and uncertainties

Symbol	Measured quantity	Unit	Uncertainties
L_1	linear dimension < 0,050 m	m	$\pm 0,2$ mm
L_2	linear dimension: $0,050 \text{ m} \leq x \leq 1 \text{ m}$	m	± 1 mm
L_3	linear dimensions > 1 m	m	$\pm 0,2$ %
P_{HL}	heat load	W	± 1 %
P_T	power	W	± 1 %
S_i	projected internal surface area of the equipment	m^2	$\pm 0,3$ %
S_e	projected external surface area of the equipment	m^2	$\pm 0,3$ %
S_m	mean surface area	m^2	$\pm 0,5$ %
S_m	mean surface area for vans	m^2	± 1 %
T_i	mean internal temperature	$^{\circ}\text{C}$	$\pm 0,5$ K
T_e	mean external temperature	$^{\circ}\text{C}$	$\pm 0,5$ K
T_W	mean wall temperature	$^{\circ}\text{C}$	$\pm 0,5$ K
ΔT	temperature difference	$^{\circ}\text{C}$	$\pm 0,5$ K
K	K -value	$\text{W}/(\text{m}^2\text{K})$	± 3 %

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.

NOTE 2 The linear dimensions L_1 , L_2 , L_3 apply to the following symbols used in Figure 1: W , H , L , l , a , b , c .

4 Requirements for containers and kits

4.1 General

The container, insulation and body kits 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, approved 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 finishes and insulation shall be resistant to temperature ranges intended to be applied

When the container is intended to be loaded with unpacked foodstuff, the internal covering materials and articles shall comply to further requirements for materials and articles intended to come into contact with foodstuffs, 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 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 little moisture absorption;
- 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 minimal ageing properties.

NOTE For reasons of energy savings, quality of the good temperature 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 effectiveness of European pallet transport and the linked dimensions.

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: