



**SLOVENSKI STANDARD**  
**SIST EN 1645-1:2005+A1:2008**

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Leisure accommodation vehicles - Caravans - Part 1: Habitation requirements relating to health and safety

Bewohnbare Freizeitfahrzeuge - Caravans - Teil 1: Anforderungen an den Wohnbereich hinsichtlich Gesundheit und Sicherheit

Véhicules habitables de loisirs - Caravanes - Partie 1: Exigences d'habitation relatives à la santé et à la sécurité

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**ICS:**

43.100 Osebni avtomobili. Bivalne prikolice in lahke prikolice Passenger cars. Caravans and light trailers

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 1645-1:2004+A1**

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## Leisure accommodation vehicles - Caravans - Part 1: Habitation requirements relating to health and safety

Véhicules habitables de loisirs - Caravanes - Partie 1:  
Exigences d'habitation relatives à la santé et à la sécurité

Bewohnbare Freizeitfahrzeuge - Caravans - Teil 1:  
Anforderungen an den Wohnbereich hinsichtlich  
Gesundheit und Sicherheit

This European Standard was approved by CEN on 25 May 2008.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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## Foreword

This document (EN 1645-1:2004+A1:2008) has been prepared by Technical Committee CEN/TC 245 "Leisure accommodation vehicles", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by January 2009 and conflicting national standards shall be withdrawn at the latest by January 2009.

This document includes Amendment 1 approved by CEN on 2008-05-25.

This document supersedes A1 EN 1645-1:2004 A1.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

This standard is one of a series covering the habitation aspects of leisure accommodation vehicles. The standard includes 14 normative Annexes.

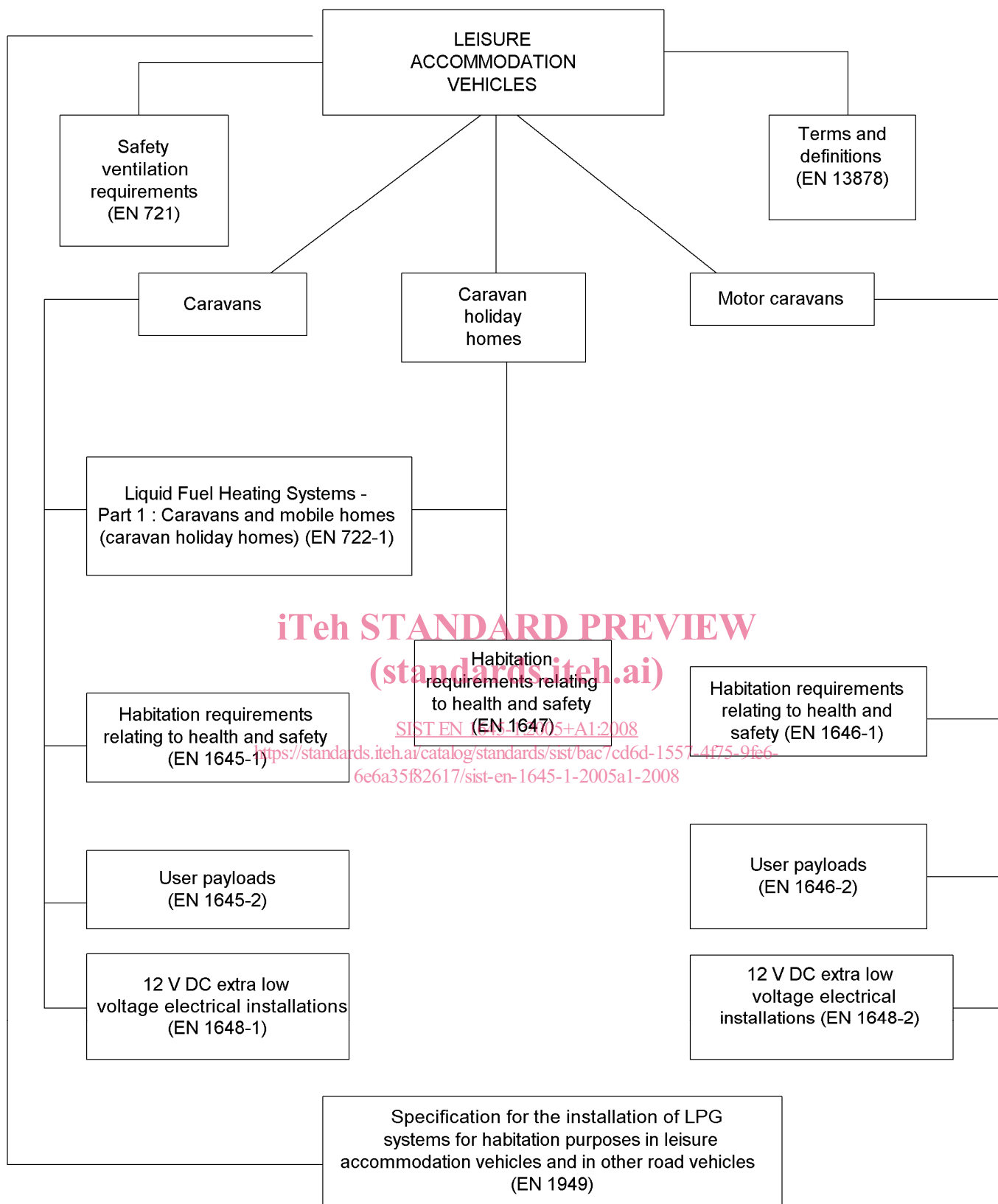
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## 1 Scope

This document specifies requirements intended to ensure the safety and health of people when they use caravans for temporary or seasonal habitation.

It also specifies the corresponding test methods.

EN 1645-2 gives requirements relating to user payloads for caravans.

Requirements applicable to road safety are not included in the scope of this document.

This document is applicable exclusively to rigid and rigid folding caravans as defined in EN 13878.

## 2 Normative references

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

EN 3-7, *Portable fire extinguishers — Part 7: Characteristics, performance requirements and test methods*

EN 721, *Leisure accommodation vehicles — Safety ventilation requirements*

EN 722-1, *Leisure accommodation vehicles — Liquid fuel heating systems — Part 1: Caravans and caravan holiday homes*

EN 1645-2, *Leisure accommodation vehicles — Caravans — Part 2: User payload*

EN 1648-1, *Leisure accommodation vehicles — 12 V direct current extra low voltage electrical installations - Part 1: Caravans*

EN 1949, *Specification for the installation of LPG-systems for habitation purposes in leisure accommodation vehicles and in other road vehicles*

EN 13878:2003, *Leisure accommodation vehicles — Terms and definitions*

ISO 4649:2002, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device*

IEC 60364-7-708, *Low-voltage electrical installations — Part 7-708: Requirements for special installations or locations — Caravan parks, camping parks and similar locations*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13878:2003 apply.

## 4 Testing

The tests described in Annex A to N are intended to verify that a caravan representative of a given model, including its fixtures and fittings, meets the requirements of this standard.

These tests are intended to simulate the most onerous conditions, for the relevant characteristics.

**EN 1645-1:2004+A1:2008 (E)****5 Design and construction****5.1 Occupancy**

The manufacturer shall designate the occupancy as the number of berths, both standard berths and additional berths provided by the manufacturer and shall include it in the user's handbook and in his brochures. The occupancy is also needed in order to determine the ventilation requirements (see EN 721).

**5.2 Rigidity**

When stationary, with the floor horizontal and all corner steadies extended to the ground, an upward thrust of 1 500 N applied to one corner steady for a duration of 15 min shall not cause the caravan to distort to an extent that would make any door or window difficult to open.

Rigidity shall be tested in accordance with Annex A.

**5.3 Corner steadies**

Each caravan shall be equipped with four steadies, one at each of its four corners. Each steady shall be retractable and adjustable in height. Each steady shall be capable, when extended, of carrying a load of not less than 25 % of the maximum technically permissible laden mass of the caravan. An appropriate operating tool shall be provided.

A certificate, from the corner steady manufacturer or supplier shall accompany the caravan to be tested showing, either by calculation or by test, the loading capability of each type of corner steady.

**5.4 Grab handles**

Four external grab handles for manoeuvring the caravan shall be located externally to the body work, one on each side at the front and one on each side at the rear.

For those caravans with a maximum technically permissible laden mass not exceeding 750 kg, two grab handles at the front of the caravan one on each side are sufficient.

The hand clearance aperture of each grab handle shall be not less than 30 mm × 120 mm.

The grab handles shall be tested according to Annex B.

There shall be no visible permanent deformation or loosening of the grab handle and/or of its fixings.

**5.5 Entrance steps****5.5.1 Heights**

When the entrance height of the caravan, measured at maximum technically permissible laden mass, and standing on horizontal ground, exceeds 400 mm, the caravan shall either be fitted with an entrance step, attachable or integral with the structure of the caravan, or a separate entrance step(s) shall be provided.

The rise of the first tread shall not exceed 400 mm. The rise of any other tread shall not exceed 300 mm.

It is recommended that all separate step(s) be attached to the caravan when in use to improve their stability.

It is recommended that the rise of the steps be equal.



### 5.5.2 Minimum tread dimensions

The minimum tread dimensions shall be:

- a) attachable or Integral entrance steps: 150 mm going x 320 mm wide;
- b) separate steps: 270 mm going x 450 mm wide.

### 5.5.3 Mechanical strength

An entrance step and any fixing devices shall be capable of withstanding a force of 2 000 N applied to any surface area of 100 mm × 150 mm of the tread.

After application of this force for a period of 5 min, any permanent deformation caused shall not exceed 5 mm.

The strength of each step shall be tested in accordance with Annex C.

### 5.5.4 Slip resistance test

#### 5.5.4.1 Attachable or integral step

An attachable or integral step shall have a slip resistant surface. The slip resistance shall be tested in accordance with Annex D.

#### 5.5.4.2 Separate entrance step

A separate step shall have a slip resistant surface. The slip resistant surface shall be tested in accordance with Annex D after having immobilised the feet or base of the step.

In addition a separate step shall remain stable when tested in accordance with Annex E.

## 5.6 Doors

### 5.6.1 Dimensions

Exterior door openings for rigid caravans shall have a minimum clear height of 1 590 mm and a minimum clear width of 480 mm.

Exterior door openings for rigid folding caravans including caravans with an elevating roof shall have a minimum clear height of 1 300 mm and a minimum clear width of 480 mm.

The measurements taken shall be clear from any protrusions or obstructions (for example fly screens, door catches, hinges, etc.), except for a radius in each corner of not more than 90 mm.

NOTE Verification of compliance can be achieved by passing a rectangular test board with dimensions 1 590 mm by 480 mm (or 1 300 mm by 480 mm for rigid folding caravans), and with 90 mm radiused corners, through the open doorway, parallel to the frame.

### 5.6.2 Securing doors

Each exterior door shall be fitted with a locking device capable of keeping it closed when subjected to all forces caused by the movement of the vehicle in normal traffic conditions.

Interior doors shall be capable of being kept in a fixed position, open or closed, in the above conditions.

**EN 1645-1:2004+A1:2008 (E)****6 Internal equipment****6.1 Bunks****6.1.1 Mattress and/or upholstery**

Bunks shall be provided with mattresses or be upholstered.

**6.1.2 Clearance**

The clear width of a bunk shall be not less than 500 mm. The clear height over 2/3 of the surface area of the bunk shall be not less than 500 mm when measured from the compressed surface of the mattress or upholstery in accordance with the test in Annex F.

**6.1.3 Protection against falling out****6.1.3.1  General**

Any bunk where the uncompressed upper surface of the mattress or upholstery is placed at a height of more than 1 000 mm from the floor, shall be protected on all sides to prevent the occupant from falling out. Any gap between one element of protection and another shall conform to 6.1.7. However any gap shall not exceed 75 mm.

All protections shall be secured against unintentional loosening.

Upper bunks shall be provided with a label with the following wording:

"Not suitable for children under 6 years old without supervision".

**6.1.3.2 Rigid protection**

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For rigid protection, the minimum height of the protection shall be at least 150 mm above the uncompressed upper surface of the mattress or upholstery. To allow for access a gap of 350 mm to 550 mm measured at its narrowest point shall be provided.

Where a rigid protection presents an apparent flexibility, its resistance shall be tested in accordance with Annex G.

A protection is considered as rigid if it is not bent more than 10 mm under a force of 100 N applied horizontally in the middle of the protection.

**6.1.3.3 Protection by curtains or nets**


Alternatively, the protection may be obtained by means of curtains or nets. The minimum height of the protection shall be at least 160 mm above the uncompressed upper surface of the mattress or upholstery, when the upper edge is loaded with 100 N in vertical direction downward.

To allow access to the bunk, the curtains or nets on at least one side of the bunk may be detachable allowing an opening 350 mm to 550 mm.

Means of emergency exit from the bunk shall be accessible from the upper surface of the bunk.

The curtains or nets shall be capable of resisting a force of 100 N applied horizontally towards the outside of the bunk for 15 s to any point and this shall not result in any tearing nor detaching nor creating any gap larger than 60 mm at the lower edge of the protection.

The strength of the curtains or nets shall be tested in accordance with Annex G.

Any gap created during the resistance test shall be measured in accordance with Annex K. 

**6.1.4 Mechanical strength**

A force of 1 000 N applied vertically downwards, for 1 h, from the midpoint of each side member of any bunk where the upper surface of the compressed mattress or upholstery is placed at a height of more than 500 mm from the

floor, shall neither cause permanent deformation of more than 5 mm of the frame of the bunk nor damage the fixing of the bunk to the structure of the caravan.

The mechanical strength shall be tested in accordance with Annex H.

#### 6.1.5 Security of folding bunks

If a bunk is designed to fold away it shall be secured against unintentional folding away.

A folding bunk shall not unintentionally move from its stored position. Both conditions will be tested in accordance with Annex I.

#### 6.1.6 Access to upper bunks

A means of access to an upper bunk shall be provided, such as surfaces of furniture, footholes in a solid component, handles or a ladder which shall be fixed or be able to be attached, to the bunk, in a safe manner.

The width of the treads between supports shall be at least 250 mm.

When a ladder is used, the upper surfaces of the treads shall be equally spaced within a tolerance of  $\pm 12$  mm, and the unobstructed distance between consecutive treads shall be  $225 \text{ mm} \pm 25 \text{ mm}$ .

When tested in accordance with Annex J the ladder shall not move when subjected to a downward static load of 1 000 N and a horizontal static load of 500 N, nor shall the ladder or its treads break or deflect permanently by more than 5 mm.

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Where it is impractical to test the bunk ladder in the caravan, it is acceptable to test an identical configuration of the ladder, its method of fixing and its range of positions of use, outside the caravan according to Annex J.

#### 6.1.7 Protection against entrapment

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When ready for use a bunk and its means of access shall not contain any open-ended tubing, nor shall there be projections, holes, loose washers, speed fixing nuts or crevices on which clothing or any part of the body could become snagged or trapped. Tension springs in the base structure are excluded. All edges, corners and projecting parts that are accessible shall be free from burrs and sharp edges.

If the base of a bunk is not covered by permanently fixed upholstery, any gap in the base not covered by the mattress shall not permit the passage of the cone (see K.1) beyond the point at which the diameter of the cone is 75 mm, when measured in accordance with K.2.

Any other gap or space within the structure of the bunk which is accessible from the upper surface of the bunk, including mattress where applicable, shall be between 12 mm and 25 mm or between 60 mm and 75 mm, (tested in accordance with K.3) or equal to or larger than 200 mm.

When a gap cannot be tested because a constructional feature prevents proper positioning of the cone, the constructional feature may be removed to the extent necessary to allow the tests to be carried out.

**EN 1645-1:2004+A1:2008 (E)****6.2 Shelves and cupboards**

Kitchen shelves and bases of cupboards and shelves at more than 1 000 mm from the floor of the vehicle at the place of measurement shall be provided with means to prevent their contents from sliding off.

NOTE Work surfaces are not considered as shelves.

Protection shall be appropriate for the items likely to be stored in the cupboards. Where an up-stand or lip is used as the method of protection, then this should be a minimum height of 5 mm.

For areas designed to accommodate large and/or heavy items, see clause 14.

**6.3 Cooking appliance**

A cooking appliance shall be installed.

**7 Drinking water supply, storage and disposal of waste water****7.1 Couplings for drinking water supply**

Couplings for drinking water supply shall be accessible on the outside of a caravan. A sealing off cover secured to the coupling or adjacent to it shall be supplied for each coupling.

**7.2 Drinking water****7.2.1 Tanks**

Water tanks, whether or not permanently fitted, shall be capable of being completely drained and cleaned.

**7.2.2 Materials**

All materials in contact with drinking water shall be of food contact quality.

NOTE For materials made of plastics, attention is drawn to the requirements of Commission directive 90/128/EEC of 23 February 1990 relating to plastics materials and articles intended to come into contact with foodstuffs.

**7.2.3 Marking**

The drinking water filling points shall be clearly identified in black or blue.

**7.3 Waste water disposal tank**

When a drinking water tank is fixed in the caravan, one (or more) waste water tank(s) of total capacity at least equal to 50 % of the drinking water tank capacity shall be provided. Any waste water tank shall be fixed or moveable and it shall be capable of being flushed and cleaned. If moveable, a storage area shall be provided.

**7.4 Toilet waste disposal****7.4.1 Discharge systems**

Discharge from a toilet shall be collected in a closed system and shall not be discharged into a waste water disposal system. Any fixed tank intended to receive discharge from a toilet shall be fitted with a level indicator or early warning device that will indicate to the user that the tank will require emptying after a further three or four uses.

**7.4.2 Outlets and couplings from toilet waste holding tanks**

The internal diameter of a coupling taking discharge from a toilet holding tank shall be a minimum of 70 mm. It shall have a bayonet type fitting to receive a 75 mm minimum internal diameter hose and a 1,5 m minimum length of such hose shall be provided.

These requirements do not apply to toilets with removable toilet waste holding tanks.

## 8 Appliances

### 8.1 Installation of appliances

Appliances shall be installed in accordance with the appliance manufacturer's instructions.

NOTE It is essential that the appliances as well as installation are in accordance with European directives and standards in force for the corresponding appliance.

### 8.2 Restriction concerning the supply of appliances

Portable appliances producing heat and non room-sealed space heating appliances shall not be supplied with the caravan by the caravan manufacturer.

## 9 Classification of thermal insulation and heating

The thermal insulation and heating levels for specific climatic conditions shall be classified as follows:

- a) grade 1: a caravan, including windows, doors and rooflights in which the average thermal transmittance ( $U$ ) of the elements of construction shall not exceed  $1,7 \text{ W}/(\text{m}^2\text{K})$ .

There is no heating requirement for this grade.

- b) grade 2: a caravan, including windows, doors and rooflights in which the average thermal transmittance ( $U$ ) of the elements of construction shall not exceed  $1,7 \text{ W}/(\text{m}^2\text{K})$ .

An average temperature difference of at least 20 K between inside and outside temperatures shall be achieved when the outside temperature is  $0 \text{ }^\circ\text{C}$ .

- c) grade 3: a caravan, including windows, doors and rooflights in which the average thermal transmittance ( $U$ ) of the elements of construction shall not exceed  $1,2 \text{ W}/(\text{m}^2\text{K})$ .

An average temperature difference of at least 35 K between inside and outside temperatures shall be achieved when the outside temperature is  $-15 \text{ }^\circ\text{C}$ .

Precautions shall be taken to ensure that the fresh-water supply can be filled at the end of the stabilizing time of one hour according to Annex M. Then the fresh-water service shall operate when the outside temperature is  $-15 \text{ }^\circ\text{C}$ .

For the three grades, the average thermal transmittance coefficient ( $U$ ) shall be calculated in accordance with Annex L or, for grades 2 and 3, tested in accordance with the method of test given in Annex M, according to the manufacturer's choice.

To ensure compliance with this clause it is sufficient to test only one caravan with the largest plan area of a specified number of similar caravans. This caravan shall fulfil the following conditions:

- 1) the bodywork, materials used and cross sectional dimensions in similar positions for the walls, floor, roof and windows are identical (except for colour);
- 2) the caravan tested shall have the largest total window area;
- 3) the space heater shall have the smallest output;
- 4) all caravans shall have the same space heating system (convected air, blown air, hot water, etc.);
- 5) the caravan shall have the least number of heating outlets (air outlets, heat exchangers, radiators, etc.) of the smallest dimensions of the caravans;
- 6) all caravans shall have the same hot and cold water supply system and any tank(s) shall have the same method of protection against freezing.