

# Leisure accommodation vehicles — Safety ventilation requirements

The European Standard EN 721:2004 has the status of a  
British Standard

ICS 43.040.60; 43.100

## National foreword

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### Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 10, an inside back cover and a back cover.

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### Amendments issued since publication

Amd. No.	Date	Comments

English version

## Leisure accommodation vehicles - Safety ventilation requirements

Véhicules habitables de loisirs - Exigences de ventilation de sécurité

Bewohnbare Freizeitfahrzeuge - Anforderungen an die Sicherheitslüftung

This European Standard was approved by CEN on 9 July 2004.

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## Foreword

This document (EN 721:2004) 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of an identical text or by endorsement, at the latest by March 2005, and conflicting national standards shall be withdrawn at the latest by March 2005.

This European Standard supersedes EN 721:1998 "*Leisure accommodation vehicles — Safety ventilation requirements*".

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## 1 Scope

This document specifies the minimum safety ventilation requirements for leisure accommodation vehicles.

It provides alternative methods of calculation or testing of safety ventilation.

## 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 624:2000, *Specification for dedicated LPG appliances — Room-sealed LPG space heating equipment for installation in vehicles and boats*

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

## 3 Terms and definitions

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

### 3.1

#### **overall plan area**

the overall plan area is measured as follows:

- a) Caravan. Overall width multiplied by overall length excluding towbar;
- b) Motor caravan. Overall width, excluding driving mirrors, multiplied by overall length. Where the accommodation section is demountable, the overall plan area is the overall length of the demountable section multiplied by the overall width;
- c) Caravan holiday home. Overall width multiplied by overall length excluding towbar. When a caravan holiday home comprises more than one element, the overall plan area is the sum of the areas of the separate elements before they are joined together.

### 3.2

#### **model**

a leisure accommodation vehicle is considered to be a different model from the tested model if any of the following apply:

- a) the exterior size and/or shape of the body is altered or in the case of a motor caravan a different base vehicle is used;
- b) the cooking appliances are situated more than 300 mm from, and/or have more burners than, the tested model and/or any other non room sealed appliance is of a different type or position;
- c) any permanent ventilation opening in the external shell of the vehicle is of a different type or situated more than 300 mm from its position in the tested model and/or there is consequent obstruction of any ventilation opening;
- d) the internal volume of the leisure accommodation vehicle, excluding furniture, differs by more than 10 %.

## 4 Requirements

### 4.1 General

Each habitable compartment, excluding toilets and bathrooms, shall be provided with safety ventilation. A habitable compartment that includes a part that can be temporarily separated by a curtain shall be considered as a single compartment.

The ventilation shall permit:

- a) renewal of air for occupants;
- b) supply of combustion air for appliances that are not room-sealed; and
- c) evacuation of the products of combustion for appliances that are not room-sealed.

This requirement shall be considered fulfilled if, for each model (see 3.2):

- 1) the minimum free area of safety ventilation is provided, in accordance with clause 5; or
- 2) the CO<sub>2</sub> content of the air within the habitable compartments of the leisure accommodation vehicle does not rise by more than 1 % absolute above the background level, when tested in accordance with clause 6 by an independent test house, and a permanent label is affixed adjacent to the cooker (see annex A).

If when the vehicle is in motion the free area of ventilation is reduced, then as the vehicle becomes stationary the ventilators shall automatically return to the position in which the free area of safety ventilation was calculated in accordance with clause 5 or tested in accordance with clause 6.

### 4.2 Ingress of products of combustion

Flue terminals shall be sited in accordance with the appliance manufacturer's instructions preferably on the roof or in the wall of the vehicle.

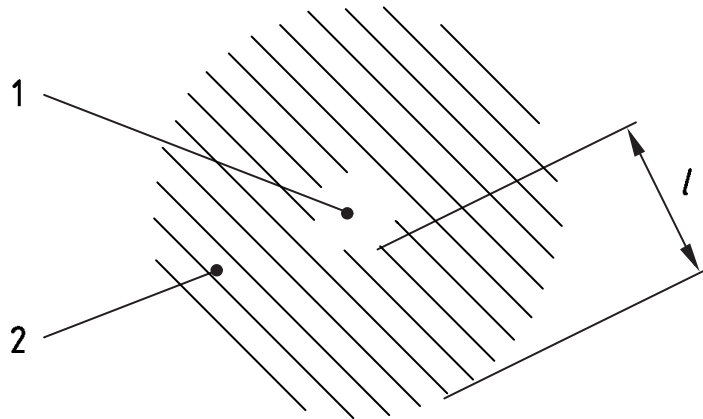
Where national legislation (see annex A of EN 624:2000) does not forbid that the flue of an appliance is designed to discharge through the floor, precautions shall be taken to prevent ingress of the products of combustion into the habitation area through ventilation openings in the floor. The terminal shall be positioned as close as possible to the sides or rear of the vehicle.

NOTE If there are underfloor flue terminals it is recommended that low level ventilation openings are positioned in the side of the vehicle and not in the floor.

Where the underfloor area is divided into distinct channels that project below the floor, e.g. by chassis members or floor bearers, there shall be no ventilation openings in the same channel as any flue outlet.

Flue terminals shall not be positioned within 500 mm of a refuelling point or fuel tank breather outlet or any ventilator from the fuel system(s).

Flue terminals positioned on a wall or a roof (except for gas appliances of not more than 30 g/h LPG consumption) shall not be fitted within 300 mm of a ventilator for the living space or an opening part of a window.

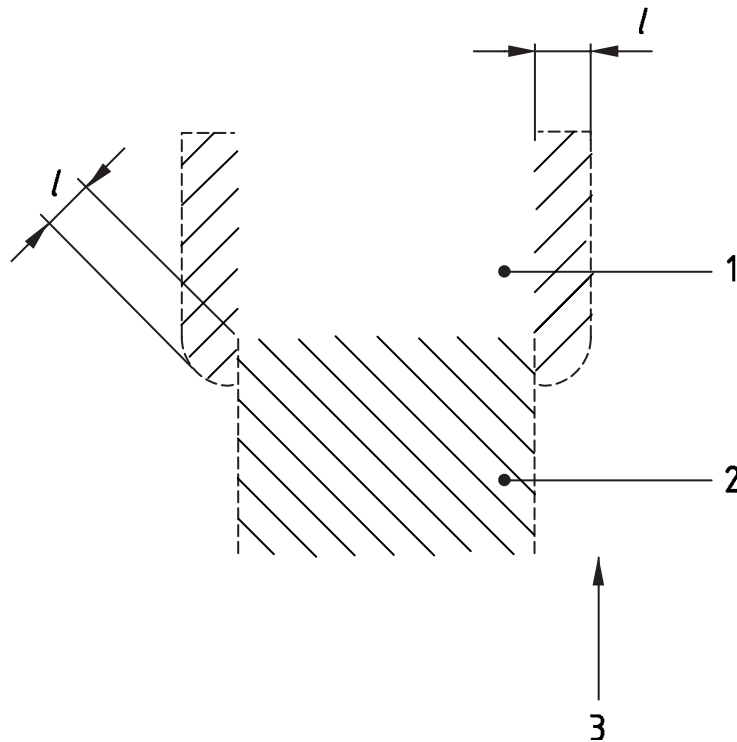


**Key**

- 1 Ventilator
- 2 Prohibited zone
- $l = 300 \text{ mm}$

**Figure 1 — Prohibited zone for discharge openings for the products of combustion in relation to ventilators**

Where the flue terminal of an appliance (except for gas appliances of not more than 30 g/h LPG consumption) is positioned vertically below an opening part of a window, the appliance shall be fitted with an automatic shut-off device to prevent operation when the window is open.



**Key**

- 1 Window
- 2 Prohibited zone
- 3 Floor
- $l = 300 \text{ mm}$

**Figure 2 — Prohibited zone for discharge openings for the products of combustion in relation to windows**



### 4.3 Avoidance of obstructions

Ventilation openings shall be positioned so that they cannot be made ineffective by drapes, curtains or other obstructions.

If the ventilation is provided to the interior through a cupboard, bed box or similar space, it shall not be possible for the passage of air to be obstructed inadvertently e.g. by items stored in these spaces.

### 4.4 Ventilator grilles

The ventilation openings shall be protected by a grille that shall be accessible for cleaning. Access may be gained by the use of a simple tool, e.g. a screwdriver.

## 5 Minimum free area of safety ventilation, by calculation

### 5.1 General

All grilles (see 4.4) shall be accounted for when providing the minimum free area of safety ventilation.

When the high level ventilation is not provided by roof vents, the minimum high level ventilation area shall be twice the values shown for roof vents in Table 1. The high level ventilation openings, which are not roof vents, shall be not less than 1 800 mm from the interior floor level of the leisure accommodation vehicle, and in no case less than 300 mm above the upper surface of the uncompressed mattress of the highest sleeping berth.

A combination of roof and wall vents are acceptable. To calculate the level of ventilation required, subtract the level of ventilation given by the roof vent from the total required. Multiply the remainder by two to give the level of ventilation required of the wall vents.

Low level ventilation openings shall be not more than 100 mm above the interior floor level.

### 5.2 Sizes of ventilation openings in habitation compartments

#### 5.2.1 Habitation compartments containing non-room-sealed appliances

Ventilation openings shall conform to Table 1.

**Table 1 — Minimum sizes of ventilation openings in habitation compartments containing non-room-sealed appliances**

Overall plan area of leisure accommodation vehicles m <sup>2</sup>	Minimum high level ventilation (Roof vents) mm <sup>2</sup>	Minimum low level ventilation mm <sup>2</sup>
up to 5	7 500	1 000
over 5 and up to 10	10 000	1 500
over 10 and up to 15	12 500	2 000
over 15 and up to 20	15 000	3 000
over 20	20 000	5 000

### 5.2.2 Habitation compartments greater than 10 m<sup>2</sup> floor area

Habitation compartments greater than 10 m<sup>2</sup> floor area, measured from wall to wall, not containing non-room-sealed appliances shall have a minimum of 7 500 mm<sup>2</sup> of safety ventilation at high level, or 15 000 mm<sup>2</sup> if not by a roof vent as well as 1 000 mm<sup>2</sup> at low level.

### 5.2.3 Other habitation compartments

All habitation compartments not having a non-room-sealed appliance installed, excluding toilets and bathrooms, shall have a minimum of 1 500 mm<sup>2</sup> of safety ventilation installed at high level, or 3 000 mm<sup>2</sup> if not by a roof vent, as well as 500 mm<sup>2</sup> at low level.

## 6 Testing

### 6.1 Preparation

6.1.1 Carry out the test in a calm atmosphere with an ambient external temperature of (20 ± 5) °C.

6.1.2 Measure the background level of CO<sub>2</sub> in the test area at a distance of 1 000 mm from the test vehicle.

6.1.3 Shut all windows, doors and manually closable ventilators and keep closed during the test period. Open separating curtains.

Place berths in the sleeping position.

Close adjustable ventilators to their minimum position. Hermetically seal the passage of all instrumentation services.

Switch off all mechanical ventilation systems.

### 6.2 Procedure

6.2.1 Measure the CO<sub>2</sub> level in the leisure accommodation vehicle compartments with a calibrated apparatus. Test all compartments concurrently.

6.2.2 If a LPG refrigerator is fitted, operate the refrigerator on LPG at its maximum setting together with any other non-room-sealed appliances, except grills, cookers or ovens.

6.2.3 To simulate occupation of the compartments, and to introduce a safety factor to cover possible extra occupants and extended use of an unattended cooking appliance, introduce a CO<sub>2</sub> producing burner fuelled by propane. The output  $W_p$  of the burner shall be adjusted using the following formula:

$$W_p = 1,2 \times [(0,1 \times P) + (0,1 \times N)] \quad (1)$$

where:

$W_p$  is the output of the burner, in kilowatts

$P$  is the number of standard berths and additional berths provided by the manufacturer in the room to be tested.

$N$  is the total number of burners of all grills, cookers and ovens within the room(s) to be tested.

Locate the CO<sub>2</sub> producing burner approximately 200 mm above floor level and take samples of the atmosphere approximately 200 mm below the ceiling at about the centre of the compartment, where a ventilation opening is not likely to have an undue influence, and not directly above the burner.

**6.2.4** Alternatively for the use of a burner fuelled by propane, CO<sub>2</sub> can be let directly into the leisure accommodation vehicle.

In this case the output in kilowatts is calculated from formula (1) and converted into the volume of CO<sub>2</sub>/h in accordance with Table 2.

Introduce the CO<sub>2</sub> approximately 200 mm above the floor level of the vehicle.

Let the thermal output calculated from formula (1) into the compartment, by means of one or more defined heating sources (e.g. heating appliance, incandescent lamp), near to the CO<sub>2</sub> emission point. A fan shall not be used.

**Table 2 — CO<sub>2</sub> volume/h at 20 °C**

Height of the testing site above sea level m	CO <sub>2</sub> volume/h at 20 °C l/h
0	125
250	130
500	133
750	137
1 000	141

**6.2.5** Take the first CO<sub>2</sub> sample after 20 min. Take subsequent samples at intervals of not less than 5 min and not more than 15 min. The test is completed when three consecutive readings are the same (at which stage the CO<sub>2</sub> level shall be deemed constant) or if the CO<sub>2</sub> concentration rises by more than 1 % absolute above the background level.

If the test is interrupted for any reason, such as opening of a door or involuntary extinguishing of a burner, abandon the test and begin a new test cycle after a minimum period of 1 h.

### 6.3 Test report

A test report shall be made including the results and a statement of whether the leisure accommodation vehicle passed or failed the tests.

## 7 User's handbook

Attention shall be drawn to the following in the vehicle user's handbook:

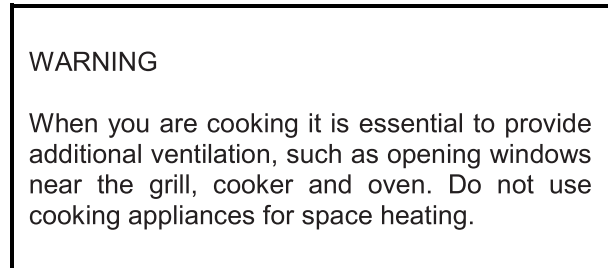
- a) that the safety ventilation shall in no circumstances be obstructed, even partially;
- b) the location of the safety ventilation and the need to keep screens or grilles clean and free from dust;
- c) that appliances such as cookers with naked flames shall not be used for room heating;
- d) that if the leisure accommodation vehicle has been tested and approved under clause 6, then the text of the warning notice specified in annex A shall be reproduced in the user's handbook;
- e) that is recommended, that any elevating roofs be raised when the leisure accommodation vehicle is used for habitation purposes.

The user's handbook shall be written in at least the language of the country in which the leisure accommodation vehicle is first sold.

**Annex A**  
(normative)

**Warning notice**

If the leisure accommodation vehicle is tested in accordance with clause 6, a permanent warning notice (see Figure A.1) shall be affixed adjacent to the grill, cooker and oven in a position where it can be easily seen, and in the language of the country in which the vehicle is first sold.



**Figure A.1 — Warning notice**

The lettering of the heading shall be in capital letters, not less than 6 mm in height and in the colour red. The rest of the text shall be printed in black and no letter shall be less than 3 mm in height.



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