TC 177

International Standard ISO 7419

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Leisure accommodation vehicles — Ventilation requirements

Véhicules habitables de loisirs — Exigences de ventilation

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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Leisure accommodation vehicles — Ventilation requirements

0 Introduction

This International Standard is one of a series on the habitation aspects of leisure accommodation vehicles, dealing particularly with construction, installation of services and general matters of safety.

1 Scope and field of application

This International Standard specifies the minimum ventilation requirements for leisure accommodation vehicles including caravans, as defined in ISO 7418.

2 References

ISO 7418, *Leisure accommodation vehicles — Vocabulary.*[1)]

ISO 7420, *Leisure accommodation vehicles — Oil-fired heating systems.*[1)]

ISO 7421, *Leisure accommodation vehicles — Liquefied petroleum gas systems.*[1)]

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 7418 shall apply.

4 Design

NOTE — Fixed ventilation should be designed to avoid draughts as far as possible, even in unfavourable weather conditions, without reducing the full area of ventilation.

4.1 Ventilator screens

All permanent openings for ventilation shall be designed to protect against the entry of vermin. Where screens are provided, they shall not have apertures of less than 6 mm or greater than 9 mm in any direction, and they shall be accessible for cleaning. The location of ventilators and the method of cleaning them shall be given in the owner's handbook.

4.2 Siting of mechanical ventilation

No extraction fan nor return air system to a warm air unit shall be sited in the same compartment as an open-flued appliance, as this can produce, under certain conditions, discharge of the products of combustion into the living space.

NOTE — Special care should be taken in the installation of mechanical ventilation, as it can have adverse effects on the efficiency of the natural ventilation system.

4.3 Ingress of fumes

No air inlet shall be positioned within 500 mm of the flue outlet of a space heater. In addition, for motor caravans, low level ventilation shall be located so that there is no danger of engine exhaust fumes being drawn into the interior.

4.4 Location of ventilators

Where there are more than two outlet openings and more than two air inlets, these shall be located around the compartment (i.e. not all on the same side) so as to give cross ventilation.

4.5 Avoidance of obstructions

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

1) At present at the stage of draft.

5 Fixed natural ventilation

5.1 Main ventilation

5.1.1 Calculation of free area

The total effective fixed free area of ventilation in square millimetres shall not be less than 4 000, or the sum of the following allowances, whichever is the greater:

a) Allowance for number of people:

$650 \times P$

where P is the number of persons for which sleeping accommodation is provided in the vehicle or compartment.

plus

b) Allowance for unflued appliances that shall be installed in compliance with ISO 7420 or ISO 7421:

$2\,200 \times U$ (when U is in kilowatts), or

$611 \times U$ (when U is in megajoules per hour)

where U is the input rating of all unflued gas, oil-fired or solid fuel appliances, including luminaires, water heaters and cooking appliances.

plus

c) Allowance for flued appliances that shall be installed in compliance with ISO 7420 or ISO 7421:

$440 \times F$ (when F is in kilowatts), or

$122 \times F$ (when F is in megajoules per hour)

where F is the input rating of all flued gas, oil-fired or solid fuel appliances that are not room-sealed.

5.1.2 Application of calculated area

The calculation in 5.1.1 shall be applied to any part of the vehicle that is a separate compartment, other than:

a) a toilet compartment (see 5.1.3);

b) a separate compartment that contains an oven, hotplate, grill or any combination thereof, that is used only as a kitchen and that does not include sleeping accommodation (see 5.1.4);

c) a compartment that results from temporary division by curtaining.

5.1.3 Toilet compartment

A minimum total effective fixed free area of ventilation of 2 000 mm² shall be provided in a toilet compartment.

NOTE — It is recommended that adjustable ventilation should be provided in addition to the fixed ventilation.

5.1.4 Compartment containing oven, hotplate or grill

No oven, hotplate, grill or any combination thereof shall be installed in a separate compartment of less than 6 m³ in volume. A minimum total effective fixed free area of ventilation shall be provided as given in the table, in a separate compartment of 6 m³ or more in volume that contains an oven, hotplate, grill or any combination thereof, that is used only as a kitchen and that does not include sleeping accommodation. An openable window shall also be provided.

Table — Fixed ventilation requirements for compartments containing oven, hotplate or grill

Volume of compartment, V m³	Minimum effective free area of air vent mm²
$6 < V < 9$	6 500
$V > 9$	4 000

5.1.5 Distribution of ventilation

The area arrived at by the formula given in 5.1.1 and required by 5.1.3 and 5.1.4 shall be divided equally between high level and low level ventilation.

NOTE — Ventilators at high level should be as high as possible and those at low level as low as possible.

5.2 Air for combustion

Additional ventilation may be required for air for combustion when oil-fired or solid fuel heating appliances are installed. Reference shall be made to the International Standard relevant to the type of installation for this requirement.

6 Testing of ventilation system

6.1 General

Any fixed ventilation system, installed in accordance with clause 4, and calculated in accordance with the method in 5.1.1, shall be verified for its efficiency, in at least one model of each range produced by a manufacturer, by means of practical tests carried out in accordance with 6.2 and 6.3. The indicated carbon dioxide (CO_2) level shall not exceed 1 %.

Where efficiency is so proved, other models in the range employing the same system shall be deemed to be acceptable. Ventilation systems are assumed to be the same when:

a) the total effective fixed free areas of ventilation calculated in accordance with the method in 5.1.1 and applied in accordance with 5.1.2, are identical;

and

b) the ventilators have the same principle of operation and are located in similar positions to the model tested.

6.2 Preparation

6.2.1 Conditions for test

The test shall be carried out in a calm atmosphere (preferably indoors) and the ambient temperature external to the unit shall

be within the range 10 to 25 °C. Where tests are carried out indoors, the level of CO_2 pollution of the building shall be measured and allowed for in the test results.

6.2.2 Sealing of vehicle

All windows, doors and closable ventilators shall be shut and sealed during the test, and adjustable ventilators closed to their minimum including the entry point of the sampling line.

6.3 Method

6.3.1 Timing of tests

All designated compartments shall be tested concurrently.

6.3.2 Simulation of occupancy and location of samples

To simulate occupation of the compartments, 10 L ± 5 % of propane gas per hour per person shall be burnt in each compartment by a device that has been calibrated for this purpose.

Any gas light in the compartment shall also be lighted during the test, but no other appliances. The burning device shall be located approximately 200 mm above floor level and samples of the atmosphere shall be taken approximately 200 mm below the ceiling at about the centre of the compartment and not where a ventilator is likely to be an undue influence.

6.3.3 Taking of samples

The first sample shall be taken at not less than 1 h after setting up, and thereafter further samples at intervals of 30 min until a steady state is reached. A steady state can be considered to be achieved when the last sample taken has no greater CO_2 content than the previous sample. The test shall be considered satisfactory if the final sample contains not more than 1 % CO_2.

6.3.4 Interruption of test

If the test is interrupted for any reason, such as the opening of a door, or a burner cut-off, a further period of 1 h shall elapse before again starting the complete test.