

Climate control and space allowance



Biology and needs of pigs

Based on the pigs' physiological and behavioural needs, the welfare of animals during transport is for a significant part dependent on being able to i) thermoregulate effectively, and ii) on the ability of the animals to perform basic behaviours such as standing and lying, to adopt a normal position, to minimize risks for injuries, stress and panic.

Importance of climate/thermal control:

- A good body condition is required to act as both an insulator and an additional energy reserve for creating body heat in **cold temperatures**. The lower limit of the thermal comfort zone of pigs is between 10-15 °C depending on body weight.
- Pigs have a very limited number of sweat glands, and therefore the major way pigs thermoregulate when **temperatures are high** is via behavioural adaptation. High humidity will aggravate heat stress.
- The upper limit of the thermoneutral zones of pigs is up to 25 °C, depending on body weight.

Importance of space allowance:

- Pigs may be motivated to lie down during transport, and after some time, they will do so if they have enough space. Pigs have a strong tendency to synchronise their activities and resting moments.
- The space above the animal (deck height) should be enough to ensure a normal standing position of the animal during transport.

Legal requirements

The legal requirements related to transport of pigs can be found in Council Regulation (EC) No **1/2005**

General conditions:

- “No person shall transport animals or cause animals to be transported in a way likely to cause injury or undue suffering to them. (...).”
- “(a) all necessary arrangements have been made in advance to minimise the length of the journey and meet animals' needs during the journey;”
- “(b) the animals are fit for the journey;”
- “(e) the personnel handling animals are trained or competent as appropriate for this purpose and carry out their tasks without using violence. (...);”
- “(h) water, feed and rest are offered to the animals at suitable intervals (...).” {Article 3}

Welfare of pigs during transport

Based on the pigs' biology and needs, two focus areas regarding welfare of pigs during transport can be identified:

Two focus areas during inspections

- ✓ Climate/thermal control
- ✓ Space allowance



Two focus areas for inspections

Relevance for pig welfare in conjunction with welfare indicators 

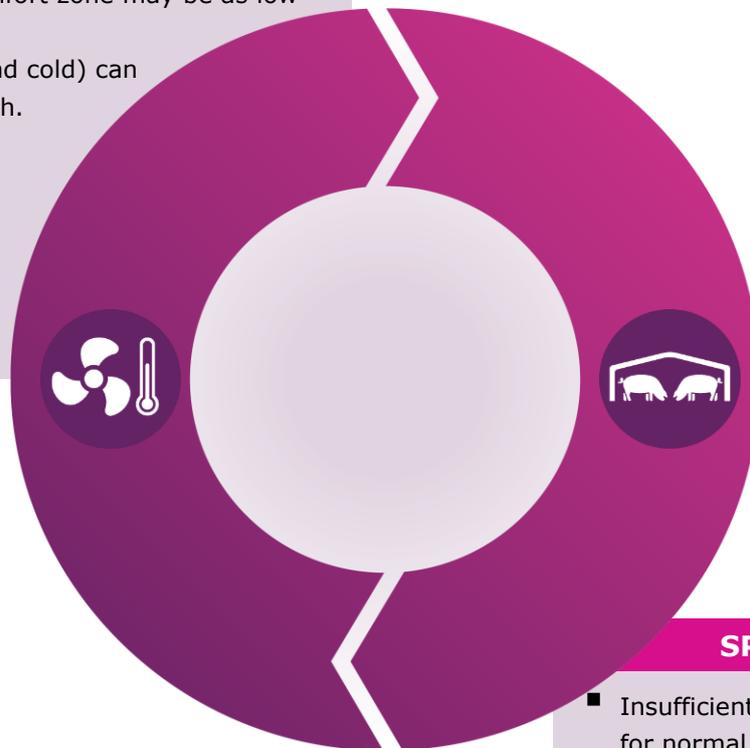


CLIMATE/THERMAL CONTROL

Thermal comfort zones of pigs related to body weight are:

- Pigs of 10 - 30 kg: 14 - 32 °C if relative humidity (RH) is lower than 80% and 14 - 29 °C if RH is higher than 80%.
- Pigs of more than 30 kg: 10 - 25 °C.
- Adult pigs (>160kg): unknown, but the upper limit of the thermal comfort zone may be as low as 15-20 °C.
- Thermal stress (heat and cold) can ultimately result in death.

-  Panting and pumping
-  Huddling and shivering
-  Dead on arrival



SPACE ALLOWANCE

- Insufficient space per animal to allow for normal behaviour can result in an inability to lay down and rest and thereby result in fatigued animals.
- Among many other reasons, death during transport has been associated with lack of space, i.e. high stocking density during transport.

-  Fatigue
-  Dead on arrival



Welfare indicators for inspections

To identify welfare issues related to climate control and space allowance



FOCUS AREA	INDICATOR	SHORT DESCRIPTION	INDICATOR FACTSHEET
Climate/ thermal control 	Panting and pumping	<p>Panting and pumping are thermoregulatory behaviours and indicate heat stress.</p> <ul style="list-style-type: none"> ▪ Panting is defined as breathing in short gasps, i.e. high frequency, shallow breathing, with mouth open. ▪ Pumping is defined as when the pig's breathing is heavy and laboured, and it is easy to see the chest rising and falling with each breath and/or to see movement of the abdominal region. 	https://edepot.wur.nl/530248
	Huddling and shivering	<p>Huddling and shivering are social and muscular thermoregulatory behaviours and indicate cold stress in pigs.</p> <ul style="list-style-type: none"> ▪ Huddling may be defined as a pig is lying with more than half of its body in contact with another pig (i.e. virtually lying on top of another pig). ▪ Shivering is defined as the slow and irregular vibration of any body part, or of the body as a whole due to muscle activity in response to cold. 	https://edepot.wur.nl/530297
Space allowance 	Fatigue	<p>Fatigued pigs are pigs without obvious injury or disease showing signs of acute stress that result from exhaustion.</p> <p>Fatigued or exhausted pigs are reluctant to move, show respiratory distress (e.g. panting), are moribund or show a generally reduced response to stimuli or reduced vigilance.</p>	https://edepot.wur.nl/530299
	<p>Dead on arrival</p> <p><i>Also 'Climate/ thermal control'</i></p> 	<p>Death is indicated by cessation of breathing and absence of a pulse (cardiac arrest). All animals which are found dead on the floor in the truck or die during unloading are considered dead on arrival.</p> <p>Space allowance and temperature are connected: high stocking density is a risk factor for overheating, i.e. especially in combination with high temperatures the risk for mortality is increased.</p>	https://edepot.wur.nl/530298

All indicator factsheets "Climate control and space allowance": <https://edepot.wur.nl/530319>

Legal requirements

Related to the two focus areas for inspections: climate control and space allowance 

Climate control



Council Regulation (EC) No 1/2005

-  **Vehicle:** "The means of transport, containers and their fittings shall be designed, constructed, maintained and operated so as to: (...) (b) protect the animals from inclement weather, extreme temperatures and adverse changes in climatic conditions; (...) (e) ensure that air quality and quantity appropriate to the species transported can be maintained; (...)." {Annex I, Chapter II, Article 1.1}
-  **Planning obligations:** "Organisers shall ensure that for each journey: a) the welfare of the animals is not compromised (...); and the weather conditions are taken into account;" {Article 5, point 3a}
-  **Ventilation:** "Sufficient ventilation shall be provided to ensure that the needs of the animals are fully met taking into account in particular the number and type of the animals to be transported and the expected weather conditions during the journey. (...). {Annex I, Chapter III, Article 2.6}

Climate control, long journeys



Council Regulation (EC) No 1/2005

Further requirements addressing climate control during long journeys (> 8 hours) {Annex I, Chapter VI}:

-  **Range of temperatures:** "Ventilation systems (...) are capable of maintaining a range of temperatures from 5 °C to 30 °C within the means of transport, for all animals, with a +/- 5 °C tolerance, depending on the outside temperature." {Article 3.1}
-  **Roof:** "The means of transport shall be equipped with a roof of light-colour and be properly insulated." {Article 1.1}
-  **Floor and Bedding:** "Animals shall be provided with appropriate bedding or equivalent material which guarantees their comfort appropriate to the species, the number of animals being transported, the journey time, and the weather. (...)." {Article 1.2}
-  **Ventilation:** "The ventilation system must be capable of ensuring even distribution throughout with a minimum airflow of nominal capacity of 60 m³/h/KN of payload.(...)." {Article 3.2}
-  **Temperature monitoring system:** "Means of transport by road must be fitted with a temperature monitoring system as well as with a means of recording such data. (...)." {Article 3.3}
-  **Temperature warning system:** "Means of transport by road must be fitted with a warning system in order to alert the driver when the temperature in the compartments where animals are located reaches the maximum or the minimum limit." {Article 3.4}

Space allowance



Council Regulation (EC) No 1/2005

-  **Space allowance:** "All pigs must at least be able to lie down and stand up in their natural position. In order to comply with these minimum requirements, the loading density for pigs of around 100 kg should not exceed 235 kg/m². (...)." {Annex I, Chapter VII, D. Pigs}
-  **Floor area:** "(g) sufficient floor area and height is provided for the animals, appropriate to their size and the intended journey;" {Article 3}
-  **Floor and Bedding:** "Animals shall be provided with appropriate bedding or equivalent material which guarantees their comfort appropriate to the species, the number of animals being transported, the journey time, and the weather. (...)." {Annex I, Chapter VI, Article 1.2}



Co-funded by
the European Union



WAGENINGEN
UNIVERSITY & RESEARCH



AARHUS
UNIVERSITY

FRIEDRICH-LOEFFLER-INSTITUT



Bundesforschungsinstitut für Tiergesundheit
Federal Research Institute for Animal Health



EU Reference Centre
for Animal Welfare *Pigs*

For any questions or suggestions
regarding this factsheet please
contact info.pigs@eurcaw.eu