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'Pilot project on best practices for animal transport'

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## Draft Deliverable D1

# OVERVIEW OF GOOD AND BEST PRACTICES

## PIGS



### ANIMAL TRANSPORT GUIDES

Report submitted by the Transport Guides consortium,  
led by Wageningen UR Livestock Research - April 4<sup>th</sup> 2016

# Executive Summary

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The objective of this report is to provide an overview from the ‘grey’ and scientific literature of good and best practices for animal welfare during transport. For the purpose of this report we define Good practices as procedures and processes that ensure compliance with requirements of legislation or regulations designed to protect the animals’ welfare. Best Practices are defined as providing additional guidance on how procedures and operations can be improved to exceed any legally defined minimum welfare requirements. The report presents an analyses of the collected information for each of five species: cattle, horses, pigs, sheep and poultry. Each species chapter (or ‘sub-report’) comprises of an analyses of the practices identified, followed by an overview of all available practices presented in tabulated form. Both the analytical text and overview tables are structured according to the relevant chapters and articles in the Regulation. The report concludes with a presentation on two specific areas of interest: the costs associated with fitness-to-travel decisions, and a brief state of the art section on satellite navigation systems. A list of the references that were identified can be found at the end of the report. The findings in the report will be used to develop Guides to Good and Best Practices in the next steps of the project.

What the data on all species have in common is that the majority of recommendations is freely available online, and directly accessible to a large international audience. However, there is hardly any information on the level of impact each of the recommendations or publications has.

The available guidelines relating to means of transport are often generic, and apply to all species. There is general consensus in terms of vehicle design, particularly in relation to ventilation, but there is a lack of detailed information on how to operate these systems (perhaps with the exception of pig transport vehicles). Another aspect which is rarely described in all species is the design and use of drinkers on board vehicles for long journeys.

There is not a lot of information available on good and best practices regarding emergency situations and driving skills. There is also a lack of specific advice on long

journeys and the associated rest stops. Only limited recommendations are available on documentation to be carried on board, and on contingency plans.

## **Pigs**

A total of 45 documents were identified as information sources for good and best practices specifically for pig transport.

There are guidelines for the assessment of fitness to travel of pigs. There is not much information on what to do with pigs which are assessed as unfit to be transported.

There are no specific recommendations regarding the means of transport of cull animals, breeding sows and piglets.

Loading and handling practices are frequently mentioned in the existing good and best practices. Additional information on unloading at slaughter or at control posts is lacking.

Space allowance recommendations are well documented, including advice on adapting the space allowance of pigs on the vehicle to the outside temperature.

There is no clear agreement between the sources about watering and feeding intervals. Information is provided concerning the type of drinkers to be used but practical guidance as to how to deliver water to pigs is missing. There is no good practice covering the type of feed for the animals during long journeys. Current guidelines do not specify the best way to deliver water or feed to pigs in transit.

There are many practical recommendations concerning the proper design and management of temperature and air flow.

## **Economic aspects of fitness to travel**

Transport of unfit animals must be discouraged. To reduce the incidence of unfit animals being transported it is important that they can be identified before loading on to the vehicle. It is essential to have alternative management options to deal with these animals. There is still a lack of guidelines for determination of fitness for travel for sheep and poultry.

If unfit cull animals can be treated medically, the benefit/cost ratio can be positive. Euthanasia and emergency killing do not provide financial benefits, but only generate costs, which are partly mitigated by subsidies. Non-compliance creates short term benefits, if the chance of getting caught is low, but will compromise the profitability of farmers and transport companies if enforcement is sufficiently high.

### **Satellite navigation systems**

Regulation EC 1/2005 requires satellite navigation systems (SNS) to monitor travel and resting times. Suitable systems have been described in the literature, but there is no evidence of a systematic use by competent authorities nor transport organizers of these systems.

# PIGS

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## 1. Pigs: Key points of interested

We examined a number of information sources related to good and best practices for the transport of pigs. References are presented in paragraph 3.2 of this report. Key points of interest for this survey are discussed below.

### References

1. 45 documents have been identified with specific recommendations regarding the transport of breeding pigs, piglets and slaughter pigs. 31 documents originate from European countries whereas the other 14 come from third countries with experiences of public or private initiatives aimed at protecting the welfare of pigs during transport.
2. A number of these (5) contain guidelines developed and published by EU official Governmental Institutions and Competent Authorities (i.e. Defra and FAWC in the United Kingdom, DARDNI in Ireland, ANSVSA in Romania, and Provincial Government of Mantua in Italy) with the main purpose to meet the legal requirements.
3. The welfare standards for pigs produced by the Royal Society for the Prevention of Cruelty to Animals (RSPCA) in the United Kingdom include a chapter focussed on pig transport in which a number of good and best practices related to the management of casualty pigs, training, pig handling and loading and travel.
4. A detailed guidance including good practices for managing casualty pigs was published in 2013 in the UK by the Pig Veterinary Society (ref 136).
5. Two Codes of practice focussed on the transport of farm animals, including specific sections for pigs, have been produced in Canada (refs 043 and 121); the first in 2001 through the collaboration between a Governmental body (i.e. Canadian Agri-Food Research Council CAFRC) and an NGO (i.e. Canadian Federation of Humane Societies), the second in 2014 through the collaboration between the National Farm Animal Care Council (NFACC) and the Canadian Pork Council representing the national pork industry. NFACC is a national

- organization bringing together animal welfare groups, government and farmers under a collective decision-making model for advancing farm animal welfare.
6. The Code of Welfare for Transport within New Zealand (ref 121) includes minimum standards and mandatory requirements for pig transport. It was published in 2011 by the National Animal Welfare Advisory Committee (NAWAC) which was established under the Animal Welfare Act to provide independent advice on animal welfare to the Minister for Primary Industries. The Animal Welfare Act is the general law in force in New Zealand according to which mandatory codes of practice may be issued and revised for the purpose of providing practical and detailed guidance in respect of any provision made by or under this Act.
  7. The Australian Animal Welfare Standards and Guidelines - Land transport of Livestock (ref 023) have been published in 2012 by the Australian Government (Animal Health Australia, AHA) to provide a basis for developing and implementing consistent legislation and enforcement across Australia, and provide guidance for all people responsible for livestock during transport. They are based on current scientific knowledge, recommended industry practice and community expectations.
  8. Guidelines issued in Brazil (ref 056) and Mexico (ref 105) were developed by research institutions to provide the livestock industry with voluntary recommendations. The former was published in 2012 and developed by the national research body (Embrapa Suínos e Aves) in collaboration with members of the NGO World Animal Protection and is focussed on good and best practices for loading and transport of slaughter pigs; the latter was developed by the Mexican government in partnership with the research institute INIFAP and issued in 2011 to provide information on responsibilities and welfare hazards in transporting pigs and on good/best practices.
  9. The Terrestrial Animal Health Code of the OIE (ref 131) includes specific chapters about livestock transport by sea, land and air, in which some good practices are provided about handling pigs according to their behaviour, the responsibilities and competences of handlers, managers of facilities at the start and at the end of the journey and at resting points, drivers and transport companies, planning the journey and managing the pre-journey period, loading, travel, unloading and post-journey handling.

10. A document (ref 073) containing good practices for pig production and marketing in family farms can also be noted as it contains some good practices for loading, and managing transport of transport pigs. It was developed in Argentina within a project for technical cooperation between the Food and Agriculture Organisation of the United Nations (FAO), the local Ministry of Agriculture, and the Instituto Nacional de Tecnología Agropecuaria (INTA).
11. Three documents with “shared good/best practices” were produced by different consortia of producers and stakeholders within the pig supply chain, at national (ref 055 and 092) or EU levels. Two of the references were produced in France as guidelines for pig transport and to assess the fitness of pigs for travel. One of these was the baseline to develop the ‘European practical guidelines to assess fitness for transport of pigs’ through collaboration and agreement between pig producer associations, a livestock traders’ association, two transporters’ associations, farmers unions, the European federation of veterinarians and two NGOs. The report has just been published in 2016 (ref 173).
12. Seven Quality Assurance Schemes have been identified in a European countries (i.e. QLL in the Netherlands, QS and VION in Germany, ABM/ABP and QMS in the UK) and in the USA (i.e. TQA) and their requirements were analysed in terms of good and best practices for pig transport in the next paragraphs.
13. Four guidelines produced by the pig breeding companies were included in the analysis: PIC (ref 135), NUCLEUS (ref 033), the Federation of pork producers of Quebec (ref 075 076) and the Pig Veterinary Society (ref 136).
14. One scientific document (ref 64), 2 handbooks (refs 137 and 158) and 6 technical papers (refs 009, 029, 050, 051, 052 and 081) including relevant recommendations on pig transport were also collected.
15. Four sources of information from training agencies (refs 004, 104 and 141) were included.
16. We have no information on the level of use nor the impact of the documents identified. It is therefore not possible to determine the efficacy of different methods of presentation or media employed.
17. The documents consist mainly of text, tables, and pictures, although a proportion of them use diagrams and other images, supporting a better

understanding of the written text. A few of them also include decision trees to support the implementation of good/best practices.

18. Most documents are available on the internet, which makes them accessible to a wide number of stakeholders worldwide.

**CONCLUSIONS:** 45 documents have been identified as information sources for good and best practices about pig transport specifically. A number of guidelines, codes of practice and recommendations concern general livestock transport but address pig transport in specific chapters. Other documents are focussed on pig welfare during transport as well as on farm and before slaughter. A few sources address specific pig welfare issues only (i.e. fitness to travel, casualty pigs). Most of the information is freely available online, but the level of use by the sector is unknown. In the following, details will be given of the single good and best practices mentioned in the reference documents.

### **Fitness to travel**

19. The main source of information “Practical Guidelines to Assess Fitness for Transport of Pigs” has been published recently, after reaching consensus at EU level among the following actors and stakeholders of the pig supply chain: UECBV, Eurogroup for Animals, COPA-COGECA, Animals’ Angels, INAPORC, COOPERL Arc Atlantique, Federation of Veterinarians of Europe (FVE), European Livestock Transporters (ELT) and International Road Transport Union (IRU) (ref 173). It is developed from previous French guidelines (ref 055). A broad consensus exists on these guidelines.
20. A number of sources (refs 055, 043, 075, 110 and 136) cover many aspects of the fitness of pigs to travel: they are mainly focussed on the distinction between animals unfit for transport, questionable animals where veterinary advice is needed and animals considered fit for transport. Detailed information is provided by these sources about conditions, lesions and signs of diseases to support harmonised assessment of pig fitness to travel. For some there is an agreement between different sources but not for all. Good practice guidance is also available (ref 124) about how to handle pigs temporarily unfit to travel because they are ill, injured, or fatigued (i.e. feeding and segregation to avoid feed and water competition).

21. The main criteria to assess fitness to travel are related to the ability to move or to keep balance, signs of circulatory weakness, prolapses, hernias and swelling, skin lesions and bleeding, late pregnancy and visual impairment.
22. This source contains recommendations for the transport of pigs with hernias, if assessed as fit to transport (e.g. isolation, more space, extra litter) (ref 141).
23. Good practices are also available about handling pigs found ill, injured or unable to walk during transportation and according to predetermined contingency plan (ref 121).
24. “Good practice related to the fitness to travel must ensure that the assessment takes into account the duration of the journey” (ref 137).
25. The guidelines indicate that as a best practice “pregnant sows or gilts should not be transported in the last third of duration of the pregnancy period (ref 121) instead of the last 10% as prescribed in current legislation”.
26. A number of sources of information include useful figures, pictures and a decision tree to support harmonised assessment of pig fitness (refs 055, 075 and 110).

**CONCLUSIONS:** The guidelines considered in this survey already cover this topic specifically. A broad consensus exists among a number of EU producers and stakeholders of the pig sector. The main focus of the available guidelines is the assessment of fitness to travel for pigs before transport. There is not much information on how to keep pigs which are assessed as unfit to travel because they are slightly ill, injured or fatigued and how to handle those pigs found unfit to travel during their transportation.

### **Means of transport**

27. There are guidelines about suitable vehicles for pig transport, which address different aspects of vehicle design and operation. They include specific recommendations depending on the countries they originate from, the legislation in place in that country, average live pig weight being transported and national considerations.
28. Issues related to ventilation are described but the practical solutions are very different from source to source and dependent on the different climate of each country (hot or cold climate). Ventilating surfaces for natural ventilation can be

measured and checked; for instance the “total ventilating area of the container sides being  $\geq 40\%$  of the total area of the container sides” has been recommended by a local Italian guideline (ref 145) in hot climate conditions. The Canadian “Recommended code of practice for the care and handling of farm animals -Transportation” (ref 043) points at “sufficient ventilation” available where the animals are on a vehicle. Although the Regulation requires that “sufficient space shall be provided inside the animals’ compartments and at each of its levels to ensure that there is adequate ventilation above the animals when they are in a naturally standing position” there is no consensus among Competent Authorities of the EU Member States on how to enforce it. For example, “at least 5 cm of space above standing animals” is recommended by an internal document of VION (ref 155) and a “free space of at least 10 cm above the highest animal” is recommended by the QLL Dutch quality assurance scheme (ref 022). In the UK and the Netherlands, the recommended “heights of partitions for pigs range from 0.60 m for piglets to 0.76 m (refs 002 and 155), 0.90 m in France (ref 052), and in Italy, 1 m for 160 kg heavy pigs (ref 145), 1.20 m for sows (ref 022) and 10 cm above the head” (ref 022). There is no consensus among a broad group of stakeholders concerning this issue.

29. In hot climates an Italian guideline recommends the presence of a high pressure sprinkler system (ref 145) and a Mexican handbook points at “available showers when the air temperature is over 25°C” (ref 105) in order to assure thermal comfort to transported pigs.
30. In case of fully air conditioned trucks a Dutch good practice recommends that “the ventilation system must function while the truck is standing with outdoor air temperature over 30°C” (ref 130).
31. Partitions in the pig truck are another issue addressed by a number of guidelines. Guidelines from the UK (ref 059) and the Netherlands (ref 155) recommend a “sufficient number of partitions to divide the truck floor into pens with a maximum length of 3.1 m”. This practice is intended to avoid stress and aggression between unacquainted animals by keeping pigs in small stable groups. In Italy, fixings for partitions at every 1 m of length of the truck floor are recommended to allow enclosures of variable size to be created (ref 145). The guidelines indicate that “the truck should be equipped with a means to separate weak pigs from other pigs” according to a Canadian handbook (ref 076) and a

Spanish guideline (ref 104). “Partitions must be designed so that they cannot be overcome” (ref 126).

32. As regards watering devices for long journeys, nipple drinkers are usually used in pig transport vehicles. “The number of nipple drinkers ranges from one every 6-8 pigs (ref 104) to one every 10-12 pigs” (ref 145). A German handbook (ref 137) is very specific in indicating that “nipple drinkers for pigs must be accessible by the mouth (about 6 cm above and 4 cm underneath the nipple space), attached in the direction of travel and slightly tilted inwards”. An Italian reference (ref 145) recommends that “the water flow of nipple drinkers for fattening pigs should be 1.5 l/min”, saying that “truck water storage should be large enough according to daily water needs per species and type of farm animal which is 2.5 l/d for adult pigs” (ref 26).
33. Regulation (EC) No 1/2005 stipulates that “access to the animals in the truck should allow inspection and care of the pigs during transport, which also requires the provision of means of sufficient lightning. Separate access on each deck should be available to access the pigs for inspection; access may be through the main loading door, although provision of a separate inspection door giving access to each floor or tier is recommended” (ref 143).
34. “To prevent pigs escaping or falling, one reference mentions that bars should be spaced 70 to 80 mm from one another” (ref 145).

**CONCLUSIONS:** The means of transport are considered in many guidelines and can be specific to pigs of different categories, but in particular for fattening pigs. There are no specific recommendations for cull animals, breeding sows and piglets. There are no good practices describing how to manage ventilation and temperature during travel.

### **Loading & handling**

35. Guidelines on how to load pigs are described in many of the guidelines identified and reviewed.
36. To avoid excessive slopes and animals sliding and dropping during loading, some companies in Europe ask for additional facilities. Ref 004 recommends loading docks whose width “should be at least as wide as that of the lorry, with a maximum of 10° (ref 148) or 15° of slope”.

37. The floor must not be slippery and the composition of the floor should ensure that the discharge of faeces and urine is kept to a minimum (ref 144).
38. Animals must always be provided with bedding or similar material(ref 155).
39. Regarding foot battens, opinions differ slightly. Ref 155 specifies 25 mm high with 20 cm of distance between them when the ramp slope is  $>10^\circ$ . Ref 074 advises a height of  $\geq 25\text{mm}$ , and battens  $\leq 35\text{ cm}$  apart.
40. Procedures for loading pigs and examples of layout for building ramps and loading docks are proposed in a Brazilian guideline focused on loading practices for slaughter pigs (ref 056) and in an Argentinian guideline for pig farmers (ref 073).
41. Some certification schemes contain self-assessments before loading the animals (refs 143 and 144).
42. For handling pigs a stock board is recommended (158 and 124).
43. The use of electric shocks can be used only in very difficult situations and in very bad loading conditions (ref 158).
44. It is recommended that "if mortality is above 0.1% in any 3-month period, a veterinary inspection must be carried out" (ref 148).
45. EFSA recommendations suggest no more than 6 pigs should be loaded at one time. Sows and boars should be handled separately, and transported in separate compartments. It also advises to keep litters of pigs from birth to slaughter together during transport and pre-slaughter lairage (ref 64).

CONCLUSIONS: Loading and handling of pigs are frequently mentioned in the existing good and best practices. However, what is missing is additional information about the unloading at slaughter or at control posts.

### **Other loading issues**

46. There is a wide range of other issues related to loading and travel contained in the various guidelines.
47. A fasting period before loading on farm to facilitate loading and to reduce mortality during transport is not mentioned in the Regulation, but is known and promoted by farmers and transporters. The documents investigated advise the

start of fasting to be between 5 and 15 hours prior to departure, and 21 to 24 hours before slaughter (refs 051, 056, 073 and 122).

48. A good practice is to only accept a pig for transport if the pig is properly marked. A Best practice is not to tattoo pigs for traceability purposes during loading because this is stressful and provokes panics, injuries and hematomas at loading (ref 124).

49. In the USA personal protective equipment is included in the certification schemes (ref 124). Some aspects of bio-security and personal equipment are part of transport certification.

**CONCLUSIONS:** There are several identified recommendations underpinning improvements in the welfare of pigs during loading and further travel, which appear covered by the existing practices.

### **Space allowances**

50. There is a lot of advice concerning space allowances, other than the repetition of the table presented in the Regulations, which mentions for the pig sector that the “space allowance for pigs of around 100 kg should not exceed 235 kg/m<sup>2</sup>”.

51. The OIE provides general recommendations concerning the minimum space allowance, and states that space allowance depends upon the needs of animals to lie down. Other factors to take in consideration: vehicle design, length of the journey, need to provide feed and water, quality of road, expected weather conditions, category and sex of the animals (ref 131).

52. The German QS certificate scheme suggests the separation of pigs in groups by means of partition walls. It recommends group sizes dependent on weight of the animals (ref 144).

53. In the USA the TQA handbook specifies that “any overcrowding should be prevented”. The handbook shows a table of densities in relation to live weight (ref 124).

54. In guidelines of the UK, the Netherlands, the USA and Canada the maximum space allowance is adapted to the weather conditions (ref 124, 076, 143, 148).

**CONCLUSIONS:** Recommendations have been found in several guidelines to specify the space allowance in accordance with the weight of the pigs. Advice on adapting the space allowance of pigs on the vehicle to the outside temperature is also presented.

## Water and feeding

55. The Regulation states that “When animals are transported water, feed and rest have to be offered to the animals at suitable intervals and appropriate in quality and quantity to their species and size. In particular for pigs, continuous access to water is needed”. (ref 072).
56. French researchers recommend restricting watering to vehicle stops during cold weather conditions, to avoid water spilling and wet litter (ref 051).
57. It is stated that water demand is about 10 % of body weight (ref 157). To meet the requirements water supply should be checked at least daily, and at least twice a day during hot or very cold weather (ref 122). The flow rates should be monitored for all watering devices and adjusted to the age of the pigs (ref 122).
58. In addition to this guidance, there are also recommendations for the installation of the watering system. It is recommended to “design, allocate and position drinkers in such a way that the needs of all pigs can be met and to utilize watering systems that are appropriate for the size of the pigs” (ref 122). According to French researchers, “nipple drinkers are an effective drinking system (ref 081) and 35 to 50 cm are an appropriate height for fattening pigs around 100 kg” (ref 137). According to the German “Handbuch Tiertransporte” (ref 137) “nipple drinkers must be enclosable with the mouth to enable pigs to drink in a way typical to their species. To prevent the pigs from injuries caused by nipples it is recommended to attach them in the direction of travel and slightly tilted inwards” (ref 137).
59. The watering devices may not be the same that the pigs are used to, it is recommended to push the nipple drinkers a couple of times for pigs to get acquainted with it (ref 122).
60. It is recommended to develop and document a strategy for water provision in freezing conditions (ref 122).
61. Animals are usually fed during stops at control posts. The Nucleus Company in France recommends loading feed from the farm of origin for this purpose because the pigs are used to this feed (ref 033).

**CONCLUSIONS:** There is no clear agreement between the sources about watering and feeding intervals to be followed during travel, each company often having its own rules. Information is provided concerning the type of drinkers to be used but practical

guidance as to how to deliver water to pigs is missing. There is no good practice covering the best suited feed for the animals during long journeys. Current guidelines do not specify the best way to deliver water or feed to pigs in transit.

### **Provisions for very long journeys**

62. There is only one document with a few recommendations related specifically to very long journeys of pigs (ref 17).

### **Managing air flow and temperature**

63. The measurement of the outside temperature and humidity is recommended (ref 124). The mechanical ventilation system should be checked if it is working with the truck engine turned off. The truck should have a temperature monitoring and warning system (ref 033).

64. A description of the objective of ventilation and its potential impact on animal physiology is found in guidelines for pig transport in New Zealand (ref 121).

65. The management of the air flow depends on the deck height. For example “at least 65 cm is good practice for piglets to ensure enough ventilation space above the animals” (ref 137). According to another source of information the deck height should be adjusted according to the pig live weight: 25 – 50 kg → 75 cm; 60 – 90 kg → 90 cm; 100-120 kg → 100 cm; >120 kg → 110 cm (ref 157).

66. Weaners should be protected from air speeds over 0.25 m/s (refs 050 and 122). To keep the temperature in the correct range, partial closure of the side vents is important, in particular in winter.

67. For breeding pigs of high value with a high health status for which it is necessary to guarantee high welfare and biosecurity standards, air conditioning is recommended with the ventilation systems of these trucks being capable of operating even if the ambient temperature is above 30°C and the truck engine is turned off (ref 130).

68. Good management practices to protect animals against warm weather include avoiding loading and driving during the hottest parts of the day (ref 122 and 009), increasing space allowance (ref 130), increasing the head space (ref 129) and inspecting the animals more frequently on signs of heat stress (ref 173). Furthermore if scheduling transport is not sufficient to avoid potential problems,

spraying the vehicle to cool it down can help (ref 129), as can parking in the shade and perpendicular to any prevailing wind (ref 129). Opening the loading ramp (ref 155) can help to get more air movement in the vehicle (ref 155). A German guideline (ref 009) recommends pig farmers and transporters to take action to cool pigs prior to loading when necessary and possible (e.g. misting, spraying).

69. Best management practices that can be mentioned for hot weather conditions include the use of light coloured and adequately insulated roofs to minimize heat stress and avoid windburn and sunburn (ref 023). Strategies should include, but are not restricted to, “deferring loading and travelling during cooler times of the day or at night, using tarpaulins and shade cloth, hoses, sprays, misters, wetting bedding in accordance with biosecurity regulations, providing water, and making sure that vehicles transporting pigs are not stationary” (ref 173). It is suggested that 5% fewer pigs should be loaded during very hot weather conditions (ref 023).
70. Cold weather loading strategies that minimize cold stress should be considered for categories of pigs that are likely to be more at risk (e.g. piglets). These strategies include: “covering sides of the vehicle with tarpaulins or other covers, and providing bedding according to biosecurity regulations”.
71. During cold weather it is recommended to pay attention to the ventilation openings, park in a sheltered place and check the animals more frequent for signs of cold stress (ref 155).
72. Recommendations about bedding material and side slats in relation to outdoor temperature are mentioned in USA and Canadian guidelines (ref 124).

**CONCLUSIONS:** There are plentiful practical recommendations concerning the management of temperature and air flow for a better welfare of pigs during transport.

## 3.2 Pigs: Overview table

### Fitness for transport

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested best practice (upgraded standards)
<p>No animal shall be transported unless it is fit for the intended journey, and all animals shall be transported in conditions guaranteed not to cause them injury or unnecessary suffering</p>	<p>(Ref 043) "Where on-farm slaughter is not permissible non-ambulatory animals (downers) should be euthanized if loading and transportation without further suffering are not possible. Non-ambulatory animals (downers) must not be removed from the vehicle while conscious. If not fit for transport the animal should be killed. Do not load or transport lame animals: animals should not be loaded if at risk of going down in transit; pigs that can't bear weight on all four legs may be in pain and are at risk of going down during transit".</p> <p>(Ref 110) "Delay transportation and reassess pigs with:  dehydration  fever (range 38.5°C to 39.5°C)  total blindness (consider on-farm slaughter)  stressed pigs showing signs of exhaustion, heat stress, weakness or PSS"</p> <p>(Ref 110) "Euthanize:  Non-ambulatory, Lameness Class 4 &amp; 5  fractures of limbs or spine  any case where pigs are unable to eat or drink due to injury or disease  chronic "poor-doers" or emaciated pigs  pigs suffering from severe non-responsive disease  prolapsed uterus  arthritis involving multiple joints  nervous disorders, such as rabies must be reported to CFIA; contact your vet before euthanizing  hernia that impedes movement, is painful, or touches the ground  severe recent injury"</p> <p>(Ref 136) "Transport asap direct to slaughter pigs with:  abscess and local infections (no fever)  recent prolapsed vagina or rectum  lameness classes 1, 2  penile or vulva injury  severe dewclaw injury  first stage anorexia or  weight loss (no fever)  frost bite  partial blindness  severe tail bite or vulva bite</p>	

<p>Animals (...) shall not be considered fit for transport if they are pregnant females for whom 90% or more of the expected gestation period has already passed</p>	<p>smoke inhalation”</p> <p>(Ref 055) Detailed document to support decision between treat, slaughter, euthanize and process or sale of casualty pigs</p> <p>(Ref 075) Practical guidance on fitness for transport to slaughter. Health signs and related courses of action are shown to support decision making of pig farmers and transporters for a list of major or minor health issues:  generalized bad health  unable to move without pain or assistance  hernia  abscess, deformation, joint inflammation  tail-biting  uterine prolapse  vaginal prolapse  rectal prolapse  pregnant or post-pregnant sows  skin lesions</p> <p>(Ref 124) Decision tree for the transport of weak pigs including. Lists of good practices are provided in terms of definitions and recommendations regarding categories of ill or injured pigs whose transport cannot be authorized or must be postponed or can be authorized to the closest abattoir with special provisions.</p> <p>(Ref 141) “Managing ill, injured, or fatigued pigs:  Handle in a humane manner  Prevent illness and injuries (i.e. feeding nutritionally sound diets, handling pigs properly, etc.)  Provide a resting area to minimize competition for feed and water  If ill, injured, or unable to walk during loading, this animal should not be transported to market channels  If ill, injured, or unable to walk during transportation and post unloading, this animal should be segregated upon arrival and care given to their special needs. Notify the receiver of any ill, injured, or fatigued animals on the transport vehicle before it is unloaded.  Never drag a live pig by its ears, legs, or tails. Do not use your foot or in any way force any pig to move”.</p> <p>(Ref 141) “Animals with hernia larger than 15 cm but without complications: fit to transport (but with extra bedding and separated). Maximum of 5 hernia pigs per compartment, with extra thick layer of litter and extra space/animal”</p> <p>(Ref 121) “A driver or animal handler who finds sick, injured or dead animals while the journey is underway should act according to a predetermined plan. Corrective actions should be taken following any animal deaths, disorders or injuries during transport to ensure future risks are minimized”</p> <p>(Ref 121) “When writing a confirmation for fitness for transport OV should also think of the duration of transport and write these in their confirmation and possibly also how long the confirmation is valid”</p>	<p>(Ref 137) Animals that are pregnant should not be in the last third of pregnancy when transported</p>
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## Means of transport

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested practice standards (upgraded)
<p>The means of transport must be fitted with partitions so that separate compartments may be created</p> <p>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</p> <p>Means of transport, containers and their fittings shall be designed, constructed, maintained and operated so as to provide access to the animals to allow them to be inspected and cared for and to provide a means of lighting sufficient for inspection and care of the animals during transport</p> <p>Means of transport, containers and their fittings shall prevent the animal escaping or falling out</p> <p>The partitions shall be constructed in such a way that they can be placed in different positions so that the size of compartment can be adapted to specific requirements, and to the type, size and number of animals</p> <p>Animals shall be handled and transported separately in the following cases: (...)</p> <p>The watering devices for long journey shall be in good working order and be appropriately designed and positioned for the categories of animals to be watered on board the vehicle</p> <p>The water tanks' total capacity for each means of transport shall be at least equal to 1,5 % of its maximum payload</p> <p>Sufficient space shall be provided inside the animals' compartment and at each of its levels to ensure that there is adequate ventilation above the animals when</p>	<p>(Ref 059) A suggested "maximum pen length of 3.1 m for pigs"</p> <p>(Ref 155) "for compartments &gt;3.1 m long: partitions"</p> <p>(Ref 145) "Ventilating surface <math>\geq</math> 40% of the total area of the container sides"</p> <p>(Ref 043) "Sufficient ventilation must be available at all times while the animals are on a vehicle. Aerodynamic airfoils installed on truck tractors to enhance fuel efficiency must not restrict airflow into the trailer which is necessary for ventilation and cooling"</p> <p>(Ref 043) "Appropriate measures must be taken to prevent engine exhaust from entering the area occupied by the animals"</p> <p>(Ref 126) "In certain emergency situations, spraying pigs with water is recommended"</p> <p>(Ref 104) "showers recommended to calm pigs after loading when outdoor temperature is over 10-15°C"</p> <p>(Ref 105) "Showers recommended when temperature is over 25°"</p> <p>(Ref 145) "High pressure sprinkler system recommended"</p> <p>(Ref 130) "Ventilation system of fully conditioned trucks able to function while truck is standing still when temp is &gt;30°C"</p> <p>(Ref 143) "Lighting must be provided on the livestock container which is sufficient to load and unload safely and allows for inspection and care of the animals during transportation"</p> <p>(Ref 143) "There must be separate access to animals on each deck. Access may be through the main loading door, but provision of a separate inspection door giving access to each floor or tier is recommended"</p> <p>(Ref 145) "Window protection bars 70 ÷ 80 mm spaced from one another"</p> <p>(Ref 126) "Partitions must be designed so that they cannot be overcome"</p> <p>(Ref 002) "Partitions should be at least 76 cm from the floor for pigs"</p> <p>(Ref 155) "Partition height at least 76 cm"</p>	

<p>they are in a naturally standing position, without on any account hindering their natural movement</p>	<p>(Ref 145) "Partitions should be solid and 1 m high"</p> <p>(Ref 145) "Partition lateral attachments installed at a distance of one meter from each other to allow enclosures of variable size"</p> <p>(Ref 076) Truck equipped with means to separate weak pigs and pigs with broken needle fragment from other pigs"</p> <p>(Ref 104) "1 nipple every 6-8 pigs"</p> <p>(Ref 145) "1 nipple every 10-12 pigs Nipples for pigs"</p> <p>(Ref 140) "Design, allocate and position drinkers in such a way that the needs of all pigs can be met"</p> <p>(Ref 137) "Nipple drinkers for pigs: must be enclosable with the mouth (about 6 cm above and 4 cm underneath the nipple space), attached in the direction of travel and slightly tilted inwards (risk of injury)"</p> <p>(Ref 145) "Recommended water flow for fattening pigs 1.5 l/min"</p> <p>-(Ref 026) "Truck water storage according to daily water needs per species and type of farm animal (adult pig 25 l/d)"</p> <p>-(Ref 155) "At least 5 cm space above standing animals"</p> <p>-(Ref 022) "Free space of at least 10 cm above highest animal"</p> <p>-(Ref 073) "Free space of about 20 cm above transported animals"</p>	
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## Loading and unloading

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested best practice (upgraded standards)
<p>The loading and unloading facilities are adequately designed, constructed, maintained and operated so as to avoid injury and suffering and ensure the safety of the animals</p> <p>Surface shall not be slippery</p>	<p>(Ref 144) QS Guideline: "the floor must be skid-proof and the composition of the floor's should ensure that the discharge of faeces and urine is kept to a minimum".</p> <p>(Ref 144) "Pigs must always be provided with bedding or similar material, depending on type and number of animals, transport duration and weather conditions"</p> <p>(Ref 155) VION recommendation: "foot battens of 25 mm high and 20 cm distance between when ramp angle &gt;10 degrees (or similar alternative)"</p> <p>(Ref 104) SPAIN-ITG leaflet for training: Good practices for ramp and lift</p>	<p>(Ref 143) Quality meat Scotland assurance Scheme; control of hauliers (Defect report template, control of the floor, partitions gates, ramp)</p> <p>(Ref 144) QS Guideline Labelling the means of transport with a signboard indicating live animals and QS certification mark, self assessment</p>

<p>Lateral protections and ramp shall be of 20°maximum</p> <p>If the ramp is more than 10° the ramp is equip with food battens For lifting platforms and upper floors they shall have Safety barriers so as to prevent falling and escaping Annex equipment in the pen (alimentation, watering device shall be positioned so that they do not cause injury, suffering or distress to the animals Appropriate lighting shall be provide during loading and unloading</p> <p>Authorization type I and II for each vehicle</p>	<p>(Ref 155) As a guideline “ramp lateral protection should be <math>\geq 90</math> cm</p> <p>(Ref 155) Sides of ramp <math>&gt;130</math> cm”</p> <p>(Ref 004) “if a ramp is used, so that the animals move voluntarily, the slope would have to be less than 15°”</p> <p>(Ref 074) As a guideline “the foot battens should be <math>\geq 25</math>mm high and <math>\leq 350</math>mm apart”</p> <p>(Ref 074) “Loading docks must be covered and 0.8-1.5 wide”</p> <p>(Ref 017) “Loading dock recommended whose width should be at least as large as that of the lorry”</p> <p>(Ref 029) Guideline for control post of high quality (handbook), type and height position of watering devices.</p> <p>(Ref 029) Shorten duration of loading time reduce mortality (scientific paper Germany)</p> <p>(Ref 104) ITG SPAIN guideline: “light in exterior and interior during loading period independently to maintain the engine of the truck during the loading”</p> <p>(Ref 144) “QS Guideline: a suitable source of light must be present for loading and unloading procedures for animal inspection, vehicles and transport containers must be accessible in order to inspect animals. A sufficient source of light must also be present for the inspection of the animals during transport. A mobile source of light may be used”.</p> <p>(Ref 056) EMBRAPA guideline provides example layout for building loading dock and ramps</p>	<p>(Ref 148) RSCPA standards: “Ramp slope maximum 10°”</p> <p>(Ref 074) “Covering the ramp with litter/straw to prevent slipping” in some cases</p> <p>(Ref 155) Recommended to “use reverse ramp to eliminate ramp slope”</p> <p>(Ref 004) “Reduce the noise” “All tail boards must be fitted with foot battens”.</p> <p>(Ref 64) “Groups of animals should be kept stable and limited to 6 pigs during loading”.</p>
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## Handling

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested best practice (upgraded standards)
<p>The personnel handling animals are trained or competent as appropriate for this purpose and carry out their tasks without using violence or any method likely to cause unnecessary fear, injury or suffering Prohibited to: strike or kick the animal</p>		<p>(Ref 124) TQA handbook USA Handling tools equipment: Physical barrier Visual barrier Auditory stimulus Visual stimulus Rules to use electric prod. 5 second between 2 shocks, no more than 2 shocks/animal Sorting board/panel</p>

<p>apply pressure to any particularly sensitive part of the body in such a way as to cause them unnecessary pain or suffering</p> <p>use prods or other implements with pointed ends knowingly obstruct any animal which is being driven or led though any part where animals are handled</p> <p>the use of instruments which administer electric shocks shall be avoided as far as possible. In any case, these instruments shall only be used for adult bovine animals and adult pigs which refuse to move and only when they have room ahead of them in which to move. The shocks shall last no longer than one second, be adequately spaced and shall only be applied to the muscles of hindquarters. Shocks shall not be used repeatedly if the animal fails to respond.</p>	<p>(Ref 158) "Suitable tool for moving of pigs is mainly a board"</p>	<p>Plastic rattle Nylon flag Matador 'scape Plastic Ribbons on a stick Last resort: electric goad Example of Dos and Don'ts of moving pigs</p> <p>(Ref 64) "Sows and boars should be handled separately and transported in separate compartments. 'Birth to slaughter' systems, where litters of pigs are kept together from birth to slaughter, including transport and pre-slaughter lairage"</p> <p>(Ref 148) "RSCPA standards: Boards must be present during the handling operation Used as a handling aid when necessary Electric goads is prohibited In vehicle Levels of transit mortality above 1/1000 pigs in any 3 month period must be subject of veterinary inspection"</p>
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## Cleaning and disinfecting rules

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested best practice (upgraded standards)
<p>The transporters meet the following additional conditions: cleaned and disinfected immediately after every transport of animals or of any product which could affect animal health, and if necessary before any new loading of animals, using disinfectants officially authorized by the competent authority.</p> <p>The must either: Have appropriate cleaning and disinfection facilities approved by the competent authority, including facilities for storing litter and dung; or provide documentary evidence that these operations are performed</p>	<p>(Ref 049) Guideline for cleaning and disinfected pig trucks in France (recommendation for cleaning platform, procedure used, visual and bacteriological control of efficiency</p> <p>(Ref 017) Guideline for High Quality control post</p> <p>(Ref 018) IKB Program (Netherlands), rules of biosecurity</p> <p>(Ref 144) "QS a Disinfection LOGBOOK date of transport species place and date of cleaning and disinfection of the vehicle trade name of the used disinfectants"</p>	<p>(Ref 124) TQA handbook how to avoid cross contaminations-Basic guidelines for sanitation, disinfection, Drying (Heat) and downtime. Summary of the mean points.</p> <p>(Ref 076) Best practices for Biosecurity and health ( FPPQ Québec). Name of the program: LDS =Lavage(cleaning), Disinfection and Drying</p> <p>(Ref 076) Checklist of the main points to control on the truck, the truck center, the bedding material used, water quality, program of cleaning and disinfection approved, method of inspection, correctives measures, detergent and disinfectant agents approved and used, model of table to use to check, protocol, one coordinator of the quality program is identified in the office. He's responsible of the LDS</p> <p>(Ref 144) QS Loading places, ladders platforms, interim waiting rooms or the marketing of the animals, entry or exit paths, spaces for loading and unloading as well as the equipment used there must be cleaned and disinfected after each type of usage. The livestock company, the transport company and the operator of the collection point must make written records of the type and usage of disinfectant</p> <p>(Ref 144) "Vehicle must be cleaned and disinfected , at the latest 29 hours after transport begin"</p>

<p>by a third party approved by the competent authority.</p> <p>The transporter must ensure that for each vehicle used for the transport of animals a register is kept containing the following information which shall be retained for a minimum period of 3 years: Point a), b), c), e), f): traceability Point d) date and place of disinfection</p>		<p>(Ref 144) "The driver must change into clean clothes before commencing the journey"</p> <p>(Ref 144) "little contact for the driver with farmyards, sheds and loading ramps, no unauthorized personnel accesses the driver's cab and loading surface of the vehicle"</p> <p>(Ref 143) Assurance scheme in Scotland (Haulage assurance scheme). "Obligation to have access to a wash and disinfect. A written agreement is required if using a third party's wash and facilities"</p> <p>(Ref 033) "For biosecurity special rules of disinfection for breeders pigs on long transport more than 8 hours: the truck arrived the day after the departure day the truck is not used in pig transport 48 h before random check by bacteriological test second disinfection before loading"</p> <p>(Ref 135) PIC breeders companies rules of biosecurity</p>
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## Fasting period

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested best practice (upgraded standards)
		<p>(Ref 155) Fasten animals before loading</p> <p>(Ref 064) "Fasting period before loading at farm level to facilitate the loading and reduce mortality level during transport"</p> <p>(Ref 051) LEAFLET IFIP Leaflet, "minimum 12 hours of fasting before loading and 24 hours between last feeding and slaughter"</p> <p>(Ref 122) "Canada Code of practice for the care and handling pigs: select and identify pigs before the transport vehicle arrives to avoid delay provide access to cool drinking water in assembly and all holding pens avoid feeding market pigs at least 5 hours prior to transport, but withdrawal of feed should not exceed 24 hours in total prior to slaughter".</p> <p>(Ref 056) EMBRAPA recommends "to fast slaughter pigs not more than 21 hours and to start fasting 10 to 12 hours before loading"</p>

## Identification at loading level

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested best practice (upgraded standards)
	(Ref 144) QS Guideline, "A transport company may only accept a pig if the pig is properly marked". (Council regulation EC 853/2004)	(Ref 124) "Not tattooing animals for traceability at the loading moment (TQA certification USA) because it's stressful and provoke panics, injuries, hematomas".

## Equipment at farm and abattoir level

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested best practice (upgraded standards)
		(Ref 124) Loading and unloading equipment at farm and abattoir level Ramps conception
		(Ref 051) "Ramp conception and resting pens at farm level before loading to limit the time of loading and reduce mortality level, improve fasting period, improve the life quality for pig farmers and drivers" (France)
		(Ref 124) Personal Protective Equipment (PPE)

## Space allowances

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested best practice (upgraded standards)
In order to comply with these minimum requirements, the loading density for pigs of around 100 kg should not exceed 235 kg/m <sup>2</sup>		Some programs give recommendations more explicit by categories and animal weight : 1) "Guideline QS (Ref 144) Minimum floor surface area /animal weight for 6-10-15-20-25-30-35-40-45-50-60-70-80-90-100-110-120-over 120 kg QS guideline gives instruction for separation of pigs in group: piglets of 10 kg=120 animal maxi/pen, piglets of 25 to 30 kg=50 animal maxi, 70 kg=20 pigs, fattening pigs=15 maxi, sows: maxi 5 sows , animals over 70 kg can be transport by group of 24 animals if they are kept together as a group at least 7 days prior to transport"  2) (Ref 124) "TQA USA handbook: no overcrowding table of space allowance depending of the weight: 6 kg-25-50-75-125-137-150-175-200-225-250-275kg"

<p>The breed, size and physical conditions of the pigs may increased of 20 % depending on the meteorological conditions and journey time</p>		<p>(Ref 124) TQA USA handbook: Take in to consideration weather conditions to define the space allowance but it's the responsibility of the transporters at final. tables of Truck setup procedures based on air temperatures humidity –side –slats closed percentage</p> <p>(Ref 148) “RSCPA standards All transporters must have a livestock capacity document on board at all times, giving: data on the size of the transporter the calculated carrying capacity for different livestock species under different climatic conditions”</p> <p>(Ref 076) FPPQ Quebec Guideline precise the “need of a individual table for each truck about the number of pigs in the compartments of the truck depending of the live weigh of the pigs”. (Ref 076) A guideline of space allowance to respect is on line in accordance with weather outside temperature and weigh of pigs (piglets 5 to 32 kg, fattening pigs from 91 to 136 kg, sows from 225 to 250 kg)</p>
<p>Sufficient space shall be provided inside the animals' compartment and at each of its levels to ensure that there is adequate ventilation above the animals when they are in a naturally standing position, without on any account hindering their natural movement</p>	<p>(Ref 052) “Height of 90 cm/compartment for fattening pigs” (IFIP Research Investigation-France)</p> <p>(Ref 155) “Minimum 5 cm above standing animals – partition at least 76 cm height” VION</p> <p>(Ref 022) “Dutch quality scheme owners: free space of at least 10 cm above highest animal minimum 60 cm for piglets, 90 cm for fattening pigs and 120 for adults sows”</p>	<p>(Ref 130) “Reduce density by 20 % if Temperature &gt;30 °C” (WLZVL program Netherland)</p>

## Watering and feeding

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested best practice (upgraded standards)
<p>Water and feed at suitable intervals and in appropriate quality and quantity</p>	<p>(Ref 137) “Height of drinkers 35 to 50 cm for pigs. Nipple drinkers for pigs: must be enclosable with the mouth (about 6 cm above and 4 cm underneath the nipple space), attached in the direction of travel and slightly tilted inwards (risk of injury)”</p> <p>(Ref 033) “Feeding at control post for breeding pigs is better if the feed is the habitual feed (load food from the farm at the starting point for breeders pigs for sanitary reasons)”</p> <p>(Ref 122): “Check water supply at least daily, and at least twice daily in hot or very cold weather, to ensure that the requirements of the pigs are being met. Design, allocate and position drinkers in such a way that the needs of all pigs can be met</p>	

	<p>Monitor flow rates for all watering devices (e.g. nipples, bowls, troughs) to ensure that all pigs have access to adequate quantities of water</p> <p>Utilize watering systems that are appropriate for the size of pigs</p> <p>Ensure that pigs are able to find water when introducing them to new surrounding</p> <p>Develop and document a strategy for dealing with emergency situations such as water provision in freezing conditions</p> <p>Adjust flow rates on nipple waterers according to the age and size of pigs in the pen"</p> <p>(Ref 051) measured 2.9 l/hour/pig by 24 hours of transport.</p> <p>(Ref 081):  "the nipple system seem to be the more effective  The watering system is effective in hot weather or summer conditions (2.4 l/pig of 110 kg at 20 °C to 4.5 l/pig of 110 kg at 30 °C and 24 hours of transport).  If the pigs have an access to feed during transport the needs are increased a lot (10 l/pig for 24 h of transport)".</p> <p>(Ref 157) "Water demand in liter is about 10 % of body weight"</p>	
Continuous access to water	(Ref 051) "The water access can be continuous or can be employed only at stop to avoid to soil the sawdust, to reduce the comfort of pigs and to reduce the water waste in cold temperatures. At hot temperature a continuous access is possible. The sawdust in this last case will be quickly soil and the quantity will need to be adapted"	
Water supply for transport by road, rail and sea containers, the water tanks total capacity for each means of transport shall be at least equal to 1.5 %of its maximum payload	(Ref 033) Control at the starting point	

## Managing air flow and temperature

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested best practice (upgraded standards)
<p>Sufficient space above standing animals for ventilation</p>	<p>(Ref 137) "To ensure sufficient ventilation , especially at high ambient temperatures recommended deck height is at least 65 cm for piglets"</p> <p>(Ref 157) "Deck height at least: 25 – 50 kg → 75 cm 60 – 90 kg → 90 cm 100-120 kg → 100 cm &gt;120 kg → 110 cm"</p>	
<p>Ensure that air quality and quantity appropriate to the species transported can be maintained</p> <p>Ventilation systems on means of transport by road shall be designed, constructed and maintained in such way that, at any time during the journey, whether the means of transport is stationary or moving, they 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</p> <p>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. It must be capable of operating for at least 4 hours, independently of the vehicle engine.</p> <p>Protect the animals from inclement weather, extreme temperatures and adverse changes in climatic conditions</p>	<p>(Ref 130) "Require ventilation system of fully conditioned trucks to be able to function while truck is standing still when temp is &gt;30°C"</p> <p>(Ref 155) "Ventilation openings on both sides of compartments, upper edge &lt;10 cm below roof"</p> <p>(Ref 050) "Protect weaned pigs from draughts and air speeds over 0.25m/s (50ft/minute)"</p> <p>(Ref 033) Control at the starting point</p> <p>(Ref 129) "When the weather is warm: Avoid excessive disturbance to stock during loading, carriage and unloading, Inspect the animals more frequently for signs of heat stress, Provide water or electrolyte solutions more frequently, Avoid penning animals in the hotter parts of the vehicle, these are located at the front end and higher levels of the vehicle, Increase the space allowance for the animals by at least 30%, Increase headroom above the animals to maximise air movement and increase the potential for heat exchange; removing tiers and folding decks where possible, Avoid travelling in the hotter parts of the day by planning the journey to take advantage of cooler conditions at night, Spray the vehicle with water to cool it down, Park in the shade whenever possible in warm weather and ideally with the vehicle positioned perpendicular to any prevailing wind, Use a vehicle with a light coloured roof to reduce the effects of solar gain (mandatory for vehicles transporting animals on journeys over eight hours), Plan short and long journeys to avoid known delays such as road works and diversions".</p> <p>(Ref 155) "Place truck in shadow when it has to wait</p> <p>(Ref 155) "Reduce loading density up to 20% when temp &gt;30°C"</p>	<p>(Ref 148) "RSCPA standards: light coloured roof and adequately insulated"</p> <p>(Ref 023) "Australia Welfare standards: in hot weather, strategies should be considered to minimize heat stress and avoid windburn and sunburn. Strategies should include, but are not restricted to, deferring loading and travel during cooler times of the day or at night, using tarpaulins and shade cloth, hoses, sprays, misters, wetting bedding in accordance with biosecurity regulations, providing water, and making sure vehicles transporting pigs are not stationary. As a guide 5 % fewer pigs should be loaded in very hot weather.</p> <p>In cold weather, loading strategies that minimize cold stress should be considered for classes of pigs that are likely to be more at risk (e.g. piglets). These strategies include: covering sides of the vehicle with tarpaulins or other cover, and providing bedding according to biosecurity regulations"</p> <p>(Ref 076) Guideline FPPQ QUEBEC Canada: this guideline gives space allowance adapted to categories of pigs (fattening pigs, piglets, cull animals) and external temperature</p> <p>(Ref 122) "Code of practice CANADA: during hot weather, schedule loading to avoid the hottest hours and avoid traveling during congested traffic conditions. Take action to cool pigs prior to loading when necessary and possible (Misting, spraying). known how to determine proper loading densities in all weather conditions in order to provide more accurate information to transporters when arranging for transport. schedule loading and transportation so that pigs can be unloaded promptly at destination"</p> <p>(Ref 124) "TQA guideline:</p>

<p>General requirements on ventilation for all means of transport:  protect the animal from inclement weather, extreme temperatures and adverse changes in climatic conditions  ensure that air quality and quantity appropriate to the species transported can be maintained  only long transport required a n insulated roof</p>	<p>(Ref 155) "Open loading ramp when truck has to wait before unloading with warm weather"</p> <p>(Ref 155 ) "In case of severe frost and wind: place truck in sheltered place and/or close ventilation openings"</p> <p>(Ref 023) "unload trucks with poor ventilation or other complications with priority after restart"</p> <p>(Ref 122) "avoid mixing during hot, humid conditions".</p> <p>(Ref 122) "during hot weather, schedule loading to avoid the hottest hours and avoid traveling during congested traffic conditions. Take action to cool pigs prior to loading when necessary and possible (e.g. misting, spraying)".</p> <p>(Ref 009) "In certain emergency situations , spraying pigs with water is recommended"</p> <p>(Refs 124, 076, 087) USA and Canada guidelines based on Temple Grandin and AMI Foundation recommend densities adapted to the pig categories (fattening pigs, piglets, cull animals) and to external temperature and other practices aimed to adapt to the weather</p> <p>(Ref 148) "RSCPA: ventilation must be capable of being adjusted, according to weather and travel conditions"</p> <p>(Ref 155) "VION Recommendations:  Place truck in shadow when it has to wait for entry  Penalize drivers for overloading  Open loading ramp when truck has to wait before unloading with warm weather  in case of severe frost and wind: place truck in sheltered place and/or close ventilation openings  daily check of functionality of ventilation and showers in lairage  unload trucks with poor ventilation or other complications with priority after restart  clear communication between drivers and slaughterhouse personnel about responsibilities"</p> <p>(Ref 009) Veterinary Association in Germany. "In certain emergency situations, spraying pigs with water is recommended"</p>	<p>practical recommendation about the bedding material and side slats depending of outside temperature (Number of sawdust bag (1 to 5) or cm from the truck floor - % of side slats closed (to 0% in hot weather to 95 % in cold weather)  measure of outside temperature and humidity  it's the responsibility of the transporters to protect pigs during all weather conditions  adjust trailer ventilation during the journey due to changing weather conditions (side boards or plugs should be added  stopping with a loaded trailer especially during extreme temperature conditions should be avoided to help prevent unnecessary stress and death loss  if pigs cannot be unloaded upon arrival in hot weather, continue driving , if possible, to generate air flow until they can be unloaded  utilize water sprinklers and fans  do not park near other animal transporters due to the potential for reduced air flow and increased risk of disease transfer  figure to explain the increases of the temperature inside a trailer with 90 % of the vents closed"</p> <p>(Ref 121) "Animal welfare code in New Zealand. Minimum Standards of ventilation.  Clear objective of ventilation:  oxygenation and of noxious gazes or impurities  ventilation adapted to maintain body temperature in the normal range for all species  if animals show signs of heat or cold stress, immediate corrective actions.  Standard number 8 of the guide:  the signs of distress associated with hypo or hyperthermia are acted and are recorded;  crate or container free of the smell of noxious gases such as exhaust fumes and ammonia  animal behavior and distribution within the container is monitored and any abnormal behavior associated with inadequate ventilation is acted on and recorded  action is taken and documented if animals show signs of overexposure to noxious gases, such as watering eyes, nasal discharge, coughing, retching, ocular/vision disorders to remove animals from the situation or improve ventilation or otherwise lower levels of noxious gas".</p>
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<p>The ventilation system must be capable of ensuring even distribution throughout with a minimum airflow of nominal capacity of 60 M3/h/100 kg live weight. It must be capable of operating for at least 4 hours, independently of the vehicle engine.</p>	<p>(Ref 144) QS certification</p>	<p>(Ref 143) Quality Meat Scotland assurance Scheme; control of hauliers (Defect report template)</p> <p>(Ref 124) "TQA guideline: Audit of means of transport and practices of transporters (Yes or No):  driver knows the emergency action and has them available in his cab  trailer is in good state (sides, flooring, ramps and gates)  driver leaves within 15 minutes after loading,  driver knows the plant requirement for boarding and bedding  water is available for misting  driver has the ability to adjust trailer ventilation during the journey if necessary"</p>
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## Journey time

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested best practice (upgraded standards)
<p>Delay during transport and suffering of animals shall be prevented or reduced to a minimum by competent authority, priority to animal transport at exit points, border inspection posts, etc.</p>	<p>(Ref 122) "Ensure all required paperwork (e.g. livestock manifests, bills of lading, emergency contact information) is completed and provided to the transporter so that the vehicle can leave immediately after loading"</p> <p>(Ref 137) shorter duration of loading leads to less death in transit</p>	

## Resting periods

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested best practice (upgraded standards)
	<p>(Ref 157) "Duration of breaks has to be at least long enough to care for each animal and to check the welfare of all animals"</p>	

## Long journeys

Legislation (Regulation 1/2005)	Suggested good practice (improvement of compliance with the legislation)	Suggested best practice (upgraded standards)
<p>The means of transport must be fitted with partitions so that separate compartments may be created, while providing all the animals with free access to water</p>	<p>(Ref 155) "partition height at least 76 cm"</p> <p>(Ref 155) "for compartments &gt;3.1 m long: partitions"</p> <p>(Ref 126) "During transport of pigs, the partitions must be designed so that they cannot be overcome"</p>	

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