



Ventilation

Ventilation systems are intended to provide optimum living conditions for pigs. A well-managed, functioning, efficient ventilation system effectively draws fresh air into a building and removes stale air containing a proportion of microbes, dust, harmful gases and water vapour. Inefficient ventilation is detrimental to pig and staff performance (particularly on hot days) and costs more to run.

Although there are many types of ventilation system, fully controlled and automatically controlled natural ventilation (ACNV) are widely used and are the focus of this factsheet.



A finisher (30 kg – 110 kg) growth rate > 750 g/day with an FCR better than 2.6

To reduce BPHS respiratory disease scores

To maintain ventilation systems in good condition

To reduce energy bills

The ventilation rate is normally adjusted in relation to temperature, which in turn is related to the age of pigs within the building. Many ventilation controllers allow the “set” temperature to be programmed to decrease as the pigs grow and have lower temperature needs; this is referred to as the “set temperature curve”. Generally ventilation rates increase as pigs get larger on account of their higher respiratory and heat output.

Humidity

- Some ventilation systems control the relative humidity (RH) within the building as well as temperature
- Heating incoming humid air will reduce the RH, increasing its capacity to remove water vapour from within the building, producing a cooling effect and a healthier atmosphere, without having to increase ventilation rate
- Pigs can tolerate a wide range of RH, from 60 to 90%

Set temperature

- The set temperature will vary from farm to farm
- You should be able to control the temperature within pig buildings for most of the year
- When the outside temperature is between -10 and +14°C it should be possible for the ventilation system to keep the building at the optimum, set temperature

- Sensors should detect deviations from the set temperature and automatically adjust fan speed/flaps as necessary
- The set temperature needs to be between the upper and lower critical temperatures (UCT and LCT) ie within the pigs’ thermoneutral (comfort) zone
- Many factors contribute to the UCT and LCT and must be taken into account when setting ventilation rates, for example:
 - Draughty pen → LCT increases by 3°C
 - Straw bedding → LCT decreases by 5°C
 - Low stocking density → LCT increases by 3.5°C
 - Kennelling → LCT decreases by 3°C
 - Restrict feeding → LCT increases by 3.5°C

Source: Controlled environments for livestock, FEC

When setting/checking the set temperatures in buildings take into account the UCT and LCT set out in the DEFRA Code of Recommendations for the Welfare of Livestock (Pigs), as well as the factors listed above.

Controlling temperature through ventilation

Remember that poor air quality can increase the risk of respiratory disease and even at very low temperatures air exchange must still take place.

- During cooler periods heat produced by the pigs helps to keep the building temperature within the pigs' thermoneutral zone
- Some heat is lost naturally through the walls and roof, but heat loss is predominantly through exhaust air
- During hotter periods the ventilation system has to remove heat as well as gases and water vapour
- If it is too hot, appetite will be suppressed, the air quality will deteriorate and pigs will be more susceptible to disease
- If the minimum ventilation rate is set too high excessive heat will be lost and feed energy will be used by pigs to keep warm
- As a rule of thumb, air speeds of 1 m³/s give the feeling of an air temperature up to 3°C cooler than the actual temperature. This may benefit larger pigs in summer; however, small pigs may suffer discomfort
- Pigs are sensitive to draughts and have a limited ability for thermo-regulation; newborn and early-weaned pigs are the most sensitive to temperature fluctuations and poor air quality
- A draft can be defined as air moving in excess of only 0.15 m/s; this is very slow - the equivalent of taking nearly 7 seconds to cover a metre!

Signs to look out for which potentially indicate too high an air speed:

- Pigs moving away from a given area
- Pigs huddling together
- Pigs dunging and urinating in the lying area
- Poor pig performance



Broken flaps are a common maintenance fault

Maintenance

Ventilation systems will only work properly and efficiently if they are kept in good condition. Consider the following common errors, faults and inefficiencies. There is room for you to record when you carry out checks.

Check	Date			
Are fans installed correctly (eg for direction of flow) without obstructions to air flow?				
Are fans and louvers cleaned regularly to prevent build up of dust and grime?				
Are sensors working properly? Test them regularly and keep spare sensors to hand.				
Are alarms fitted in every building to alert staff of system failure or if the temperature rises/falls outside the recommended band? Alarms must be tested weekly.				
Is an annual service carried out by the manufacturer?				

Common maintenance faults to look out for include:

- Worn fan bearings
- Burnt out fans
- Inlets blocked with rubbish
- Damaged, dirty/rusty blades
- Poorly fitting doors
- Broken windows
- Damaged/poorly maintained controllers

Investigating air flow patterns

You can check how air is moving in your buildings using a smoke plume. By placing the smoke source at various points, eg inlets, outlets and within pens, you can check that the ventilation system is working correctly and where any draughts are.



Check movement of air by using a smoke plume

For more information on controlling the environment of pig buildings refer to the BPEX Certificates of Competence: Stage 2 (Unit 7) <http://www.bpex.org.uk/PracticalAdvice/Training/OnFarmTraining.aspx>