Improving ventilation in the beef shed

Practical Guide

The conditions animals are housed in have a significant impact on their productivity, health and welfare. This in turn will affect farm profitability and have an impact on the farm carbon footprint.

Inadequate ventilation is a significant risk factor, particularly for respiratory conditions such as pneumonia, which is probably the most significant disease problem in beef herds. It is normally possible to make alterations to buildings to improve ventilation, but it is important to understand what you are trying to achieve.

This practical guide looks at maximising performance of housed cattle by improving ventilation in buildings.

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Housing conditions and respiratory health

Good ventilation is essential to prevent respiratory (and other) diseases. Respiratory pathogens (bacteria and viruses) do not survive for long once exhaled by the animal when ventilation is effective. However, in a poorly ventilated environment, pathogens can survive for relatively long periods because of the more humid conditions. If not quickly expelled from the building they provide a significant reservoir of infection in the air - easily spreading disease from animal to animal.

It's worth consider the purpose of livestock housing, for example:

- to provide stock with protection from weather extremes such as driving rain for days on end, and give a dry lying area
- to reduce poaching/damage to land from out-wintered stock
- to facilitate efficient management, e.g. quickly feed large numbers of cattle or calve cows indoors under supervision.

It is not necessary for beef cattle to be 'kept warm' in the UK (except artificially reared calves in very cold weather).

Websites

www.farmingforabetterclimate.org

www.fas.scot/

www.agrecalc.com

The European Agricultural Fund for Rural Development
Europe investing in rural areas

Scottish Government
Riaghaltas na h-Alba
gov.scot

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Improving ventilation

Ventilation basics…

Adequate ventilation should ensure that there is sufficient fresh air coming into the building to replace the warm damp air exhaled by the animals. The aim is for the air to be completely changed every 6 minutes, at a minimum.

The space available for air to get into and out of the building is key. 'Natural' ventilation relies on the principle that the wind causes a difference in air pressure inside and outside the building, drawing in fresh air and displacing the stale. The 'stack effect' is where heat generated by the animals rises and escapes near the top of the building, e.g. from the ridge, and in turn this draws fresh air in lower down. The best ventilation is achieved by a combination of both 'natural' and 'stack' effects.

Smoke testing (pellets are cheaply available from plumbers merchants), ideally on a muggy day, will identify ventilation issues. The aim is for smoke to ***clear completely*** in 2 – 3 minutes, and it should not linger in corners.

Achieving good ventilation

The first step is to ensure that buildings are not over-stocked as this increases the volume of damp air breathed out and the temperature inside the building. The physical proximity of the animals to each other also increases the rate of transmission of bacteria and viruses. The table shows the ***minimum*** space allowances for cattle:

Weight	Total Floor Area (m^2/head)	
	Solid floors	**Slatted floors**
60 kg	1.10	Not suitable for stock less than 200 kg
85 kg	1.80	
140 kg	2.40	
200 kg	3.00	1.10
300 kg	3.95	1.50
400 kg	4.90	1.80
500 kg	5.85	2.10
600 kg	6.80	2.30
Beef cow and calf	8.00	3.00

A farm buildings specialist can calculate how much air inlet and outlet space are needed to provide sufficient ventilation for the stock type and number you wish to house, however the general principles are as follows:

The **outlet** is probably the most important feature and an unrestricted open ridge of 0.3 – 0.4 m wide is good for ventilation. A protected or cranked ridge should be avoided as this can reduce the air outlet by around 80%. Whilst an open ridge will potentially let water into the building, if the shed is stocked correctly this will be reduced by the flow of warm air up and out and represents only a small proportion of the total moisture in the building – locating the ridge above a central feed passage will also help to avoid getting bedding wet.

A good air **inlet** can be achieved in numerous ways, however using space (Yorkshire) boarding, perforated sheets, or plastic mesh are amongst the most common on modern buildings. The area of ventilated wall will depend on how much total air inlet is required (depending on number/type of stock) and the type of material. Normally it is recommended that the total area of inlet ventilation is twice that of the outlet.

Natural ventilation is best when buildings are sited at right angles to the prevailing wind direction. The location of the building relative to other buildings is also important – for instance a 9 metre high building will have an effect on a neighbouring building up to 21 metres away.

Draughts are to be avoided so note whether animals choose to lie in a particular part of the building – the benefit of a large airy space for stock is lessened if they all choose to lie in crammed into one corner!

Other considerations

- Minimise moisture in the shed by ensuring water troughs are working properly without leaks, and that there are no leaks from overflowing gutters.
- Keep bedding dry.
- Clipping cattle' backs at housing will reduce sweating and help them to regulate their temperature.
- Identifying the pattern of airflow in a larger building housing several groups of stock (e.g. calves housed in the same building as older stock, or mixed age groups of calves) could help to manage groups, i.e. younger calves should be house in 'upwind' of older stock.
- If you can't improve natural or stack ventilation within a building artificial ventilation (e.g. fans) may be necessary.