



## Fresh air

Viruses and bacteria do not survive well in fresh air. Ensuring good air quality in cattle buildings reduces infectious burdens and also promotes lung defences.

Air quality is compromised when moisture, dust, viruses, bacteria and noxious chemicals (e.g. ammonia) accumulate.

Air quality can be improved by removing stale, contaminated air from inside the building and replacing it with fresh, clean air from outside.

### Fresh air

In order to get fresh air into a building, you need:

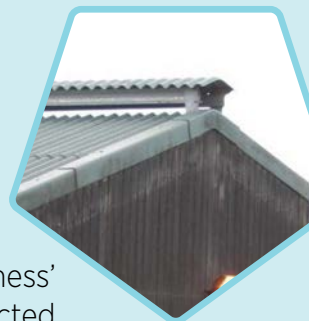
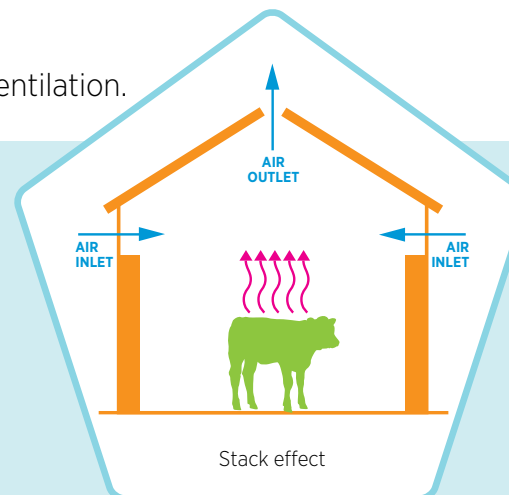
- **Inlet** – Somewhere for fresh air to get in
- **Outlet** – Somewhere for stale air to get out

Fresh air can be provided by either **natural** or **forced** ventilation.

### Natural ventilation

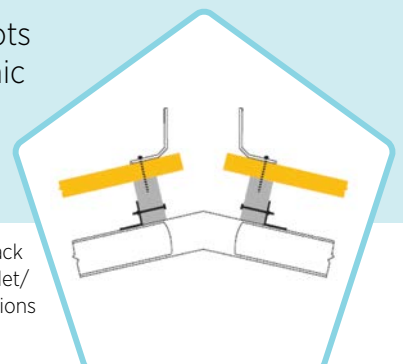
Uses heat generated by cattle inside a building to drive a ventilation cycle called the 'stack effect'. The efficiency of natural ventilation is determined by various factors:

- Area of outlet – roughly  $0.04\text{m}^2$  is required for calves, rising to over  $0.1\text{m}^2$  for adult cattle
- Design of outlet – certain open-ridge designs will enhance the stack effect
- Area of inlet – minimum 2x outlet area, ideally 4x outlet
- Pitch of roof – steeper pitches enhance the stack effect
- Stocking density – small calves in large air spaces may not generate sufficient heat to drive the 'stack effect'
- Position of inlet – if close to or adjoining other buildings the 'cleanliness' of the incoming air could be reduced, and ventilation efficiency affected
- Cold buildings – inherently cold buildings (those with lots of exposed concrete, high moisture levels and no organic bedding) will reduce the amount of heat available to drive ventilation



Air inlets can be controllable according to weather conditions

Design of the ridge will alter the performance of the stack effect. Where air quality is poor owing to lack of outlet/inlet, take specialist advice on building alterations





## Forced ventilation

Forced ventilation uses mechanical systems to drive the removal of stale air and provide fresh air. There are two types of fans for improving air quality:

- a Ventilation fans** replace a natural inlet and force fresh air IN. Sufficient outlets are required for these systems (to avoid the recirculation of stale air), and care must be taken to ensure even distribution of incoming fresh air
- b Extractor fans** remove stale air FROM a building. These are generally only of use in either small spaces or fully controlled (sealed) buildings, as otherwise, it is very hard to avoid ventilation 'dead-spots'

Mechanical ventilation - fresh air enters the building through holes placed in the plastic tube. Outlet is via the open sides of the building

