Guidance on Evaluating Calf Barns Relative to Ventilation Needs

This decision tree can be used to provide general guidance on calf barn ventilation system evaluation. Calf ventilation systems are evaluated to provide ideal air exchange in the calf nose zone, located at the same level above the bedding as the calf’s nose would be when in a lying position. Please note this is a guidance for performing a first line assessment of the ventilation in a specific facility. Further evaluation is likely needed to conclude if the barn is adequately ventilated.

**Is the current system Natural Ventilation or Mechanical Ventilation?**

- NATURAL
  - Does the barn site experience sufficient natural wind during most days, in all seasons of the year?
    - YES
      - Is the barn oriented so wind moves across the width of the barn?
        - YES
          - During the warm seasons, is there an adequate amount of air movement most days?
            - YES
              - Does the temperature inside the barn exceed that of the ambient temperature by more than a few °F?
                - YES
                  - Improved ventilation is likely needed at calf level.
                - NO
            - NO
        - NO
    - NO
- MECHANICAL
  - Was the system designed by a ventilation system design professional?
    - YES
    - NO
  - Does the system accommodate multiple seasons?
    - YES
    - NO
  - Does the barn have a method of air exchange during late fall, winter and early spring?
    - YES
    - NO

Recommendations:

- During the warm seasons, air movement should be adequate to help keep calves cool.
- In cold temperatures, ensure air outlets are designed to allow for air exchange without creating a draft.
- A well-designed system will include different rates of air exchange for each season to meet the calf air quality requirements and provide calf comfort.
- Improved ventilation may be needed to meet the ventilation needs of the calf.

For further guidance, contact a ventilation system design professional.

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Footnotes:

1. Distance between adjacent sidewalls of two barns should be at least the height to the peak of the roof x 3.5.
Does air exchange exist during colder seasons through the calf nose zone?
(Openings for natural air exchange are utilized to move air thorough the calf pen during late fall, winter and early spring. Openings could include curtain openings, eave openings, open ridge, etc. It is important that the barn is not completely closed off from natural air flow. Closing the barn off to retain animal heat does not allow for quality air.)

Are the sidewalls at least 10 feet high to allow winds to enter the barn and no solid pen partitions?

Does the facility have full-wall automatic curtains or well managed manually operated curtain sidewalls?
(Well managed manually operated curtains are often assessed and adjusted many times per day to match the changing weather conditions.)

Are large openings (doors, curtain walls, etc.) managed to work alongside, and not negatively impact the controlled introduction of air mechanical systems provide?
(Most mechanical ventilation systems are negatively affected by unplanned openings in the structure. These systems rely on control of air streams to exchange air through the calf pen.)

Is there a manure gas odor at calf nose level?
(Manure gas can be accessed by placing your nose at this position immediately upon entering the calf barn. There should be little or no ammonia odor. A gas detector apparatus can also be used to take accurate measurements of ammonia levels.)

The potential exists that the barn is adequately ventilated.
Improved ventilation is likely needed at calf level.
The potential exists that the barn is adequately ventilated.

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REFERENCES