



## **Fresh Air Improves Production Manage Barn Curtain Walls During Fall and Winter Conditions**

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With corn silage and haylage properly ensiled, it is time to get your farm ready for the winter season. On the top of your winter to-do list, be sure to include making barn curtain wall adjustments for late fall and winter barn ventilation. Proper adjustments help maintain an ideal housing environment that promotes healthy cows and contributes to achieving maximum milk production.

Proper curtain wall adjustment doesn't mean totally closing up your barn! Even in the dead of winter, you need to provide adequate barn air exchange. Winter air exchange is accomplished by managing sidewall openings provided by proper adjustment of barn curtains.

During the summer season, barn curtain walls are preferred to be fully open permitting maximum air exchange. Air exchange removes heat, moisture, and contaminants produced year-round by cows by replacing stale barn air with "fresh" outside air. For a Holstein cow, research in Missouri has shown that a percent of optimal milk production as correlated to ambient air quality is near or at 100 percent for a temperature range of -15 to +72 degrees and from 55 to 70 percent relative humidity. When your barn air quality is in these ranges, your cows' production shouldn't be limited because of air quality.

In winter, most of the heat produced by cows will be lost through heat transfer from the barn to the outside air in the same way that your home loses heat. Moisture is a different matter. The amount of moisture produced by lactating cows in the winter, as documented in the American Society of Agricultural Engineering standards, is approximately 0.9 lbs. water vapor per hour per 1,200 pound cow from respiration alone. This moisture must be removed from your barn. Unlike heat, moisture can only be economically removed from your barn by replacing the moisture-laden barn air with "fresh" outside air. This air exchange process allows dryer outside air to pick up moisture as it moves through your barn. When this air exits through an outlet, it carries the original moisture load, plus a percentage of that produced by the cows.

Your goal is to allow the necessary amount of fresh air to enter your barn and the subsequent stale air to leave your facility. In modern free stall barns, this air exchange is accomplished with curtain sidewalls. When managed correctly, their openings create the needed fresh air inlet and stale air outlet. Optimal management is usually best accomplished by utilizing automatic curtain controllers.

Proper management of curtain sidewalls for winter ventilation can be simplified by following this rule of thumb for normally stocked cold barns as suggested by Dr. Richard Stowell, Ohio State Livestock Facilities Specialist: Maintain an inside-outside temperature difference of no more than 5 to 10 degrees. With temperature differentials greater than this range, air exchange will be compromised and barn air quality will not be optimal. Similarly, with fully insulated barns, the temperature differential should be no greater than approximately 20 degrees.

With split curtain systems, the bottom curtain should be fully closed when persistent cold winds cause chilling drafts in your barn. Manipulate top sidewall curtains to allow adequate fresh air to enter your barn and stale air to exit.

With a single curtain system, close approximately the bottom 1/2 the sidewall height to minimize cold air drafts directly on the cows. Manage the remainder of the single curtain in the same way as recommended for the top curtain of a split system.

Typically, with a barn positioned to take maximum advantage of prevailing winds, the top curtain on the west or northwest longitudinal side of the barn is positioned to provide a fresh air inlet while the top curtain on the opposite side is used to provide a contaminated air outlet. Barns with open ridges allow another location for stale air to leave the barn and are very effective and highly recommended.

During strong winds, less open space is needed to allow air to enter your barn. As wind velocity decreases, more open sidewall area is needed to allow the required amount of fresh air in. Typically, producers will leave the upper sidewall of the leeward curtain open in all but the worst weather conditions.

Proper wintertime curtain wall management is crucial to maintain correct barn air quality as cows continue to produce heat, moisture, and contaminants in cold weather. But don't wait until it's bitter cold to ensure proper operation. Faulty curtain walls are less likely to be properly adjusted thus compromising barn air quality.

## **Curtain Checklist**

Before winter, perform a preventive maintenance check of curtain material and operation hardware.

- ✓ Make sure all lift lines, pulleys, and manual and electrically operated winches are operating properly.
- ✓ Check ropes and braided wire lines. Have they deteriorated? Are they free to move through the support pulleys?
- ✓ Power wash curtains to remove the dust and dirt that accumulated during the summer. Clean curtains allow more winter light penetration.
- ✓ For automated systems, are they turned on and are the programmable settings correct?