

Wind Tunnel Ventilation – Not for Winter

Wind tunnel ventilation (fans on one end of the barn and inlets on the opposite end) has gained a lot of popularity in recent years as a method of providing hot weather ventilation and air velocity in stall barns. Wanting to maximize their investment in a wind tunnel system, many producers have tried to extend use of the system into colder seasons. As cold weather approaches, they find the high airflow rate causes cold, drafty conditions in the barn. The logical solution for that problem is to switch off all but one of the high capacity fans. This is probably adequate with mild temperatures outside. As the temperature goes lower, however, a typical wind tunnel fan (20,000 cfm) causes building temperature to drop too low. So now what are the choices? The minimum continuous winter ventilation rate for 50 cows of 1400 lbs is 2500 cfm, well below (13%) the capacity of one wind tunnel fan. Attempts to reduce airflow delivery from the fan have included:

1. Change pulley size to cause fans to run slower.
2. Install two-speed motors to cause fans to run slower.
3. Install variable-speed motors to cause fans to run slower.
4. Install obstructions to fan intake.
5. Severely restrict inlets.

Several of these methods may not reduce fan capacity sufficiently and/or may cause a motor to overheat.

Another method commonly used is to control one fan with a thermostat so it shuts off when the indoor temperature drops below a certain point. In very cold weather, this can result in extended periods of fan off time with short bursts of high capacity operation. During the off period (frequently early in the morning), accumulation of contaminants (moisture, ammonia, pathogens) assault the animals' respiratory tracts and immune systems. When sufficient heat builds up, the fan switches on and delivers an icy blast onto the animals. A 20,000 cfm fan will cause one air exchange in a 50-cow barn within 1.5-2 minutes.

Some producers are converting stall barns into baby calf barns by installing plywood panels in place of the stalls. Several of these producers have complained that wind tunnel ventilation systems cause cold, drafty conditions at the inlet end and low air quality conditions at the fan end, with reasonable air quality in the center of the barn. Animal health has been a problem at both ends of the barns.

So what is the resolution to the problems of using a wind tunnel ventilation system in winter? The best answer to this question is to realize that this system is designed for summer and that it cannot be effectively modified for cold season use. Once this realization has been reached, one can begin to consider other viable mechanical ventilation systems which provide a minimum continuous supply of fresh air evenly distributed within the barn and flexible enough to have higher airflow rates when temperatures moderate. These types of systems are explained in most MidWest Plan Service livestock housing handbooks and in detail in *Mechanical Ventilating Systems for Livestock Housing*, MWPS-32.

These publications are available through county extension offices throughout the midwest.

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