IOWA STATE UNIVERSITY
Extension and Outreach

Summer Ventilation and Heat Abatement Checklist for Dairy Barns

Brian Dougherty, Field Ag Engineer, Iowa State University Extension and Outreach 563-583-6496 brian1@iastate.edu

Tools: Weather meter (wind speed and temperature, optional relative humidity), fogger or smoke stick, manometer (mechanically ventilated barns), bucket, stopwatch.

Table 1. Ventilation targets for heat abatement in naturally ventilated or hybrid ventilated barns.

Measurement	Target	Notes
Airspeed in cow resting area	200 ft/min (2.25 mph) minimum across entire resting area	Measure at ~2 ft from stall/bedded pack surface. Check multiple locations. Use fogger or airflow indicator to identify areas with poor airflow near divider walls or other obstructions. Add ventilation as needed.
Airflow in holding area	1000 cfm per cow minimum	Check manufacturer rating for fan output in cubic ft. per minute (cfm). Fan cfm x # of fans ÷ # of cows = cfm per cow
Ridge vent	2" opening per 10' building width	
Sidewalls	> 1/2 sidewall area open	
Maintenance	Monthly	Clean fans and thermostats, verify recirculation fans turn on at 68°F.
Maintenance	Annually	Tighten/replace worn fan belts, lubricate as needed.

Table 2. Ventilation targets for heat abatement in mechanically ventilated (tunnel or cross) barns.

Measurement	Target	Notes
Airspeed in cow resting area	200 ft/min (2.25 mph) minimum across entire resting area	Measure at ~2 ft from stall/bedded pack surface. Check multiple locations. Use fogger or airflow indicator to identify areas with poor airflow near divider walls or other obstructions. Add ventilation as needed.
Airflow in holding area	1000 cfm per cow minimum	Check manufacturer rating for fan output in cubic ft. per minute (cfm). Fan cfm x # of fans ÷ # of cows = cfm per cow
Inlet airspeed	500 – 800 ft/min (5.7 – 9.0 mph)	Measure with all fans on. Increase or restrict opening or add fan capacity to achieve target range.
Ridge vent	Closed during warm weather (hybrid barns)	Usually no ridge vent in fully mechanically ventilated barns.
Static pressure	< 0.15 inches H2O (< 37 Pa)	Use manometer with attached air tubes to check difference in static pressure inside vs. outside the barn. Excessive static pressure will restrict airflow. Add inlet area if pressure is too high.
Airspeed under baffles	400 – 500 ft/min (4.5 – 5.7 mph)	In cross-ventilated barns mount baffle vertically 9 - 10 ft above floor, 1 ft gap at top, centered over stalls. Baffles are not effective for cooling in tunnel ventilated barns.
Maintenance	Monthly	Clean fans and thermostats. Verify fans turn on according to schedule.
Maintenance	Annually	Tighten/replace worn fan belts, lubricate as needed.

Table 3. Sprinkler system targets for heat abatement in dairy barns.

Measurement	Target	Notes
Holding area*	0.03 – 0.05 gal/ft^2 of holding area per min.	Use bucket to catch water from several nozzles. gpm per nozzle x # nozzles ÷ holding area size (ft^2) = rate Avg wetted distance from curb (ft) x nozzle spacing (ft) = approximate wetted area (assumes spray overlap).
Feed alley	0.03 – 0.05 gal/ft^2 of wetted area per nozzle per cycle.	Use bucket to catch water from several nozzles. Gallons/cycle ÷ wetted area (ft^2) per nozzle = rate Avg wetted distance from curb (ft) x nozzle spacing (ft) = approximate wetted area (assumes spray overlap).
Feed alley wetted area	6 – 8 ft from feed curb	Use nozzles with large droplet size. Low water pressure (< 20 psi) works best.
Timer settings holding area	1 minute on 6 minutes off	Turn sprinklers on above 70°F.
Timer settings feed alley	0.5 – 1.5 minutes on 10 minutes off	Turn sprinklers on above 70°F. Switch to 5 minute off period above 85°F.
Maintenance	Monthly	Clean thermostats, water line filters, and plugged nozzles.
Maintenance	Annually	Verify sprinklers turn on at 70°F. Use stopwatch to verify schedule. Verify cows are wetted to skin.

*Never use sprinklers in the holding area without mechanical ventilation. The increased humidity from sprinklers can cause severe heat stress without additional air movement.

Table 4. Water access recommendations for dairy barns.

Measurement	Target	Notes
Holding area exit	8 ft. linear trough minimum	Up to double 24 parlors. Add more trough for larger groups.
Freestall/bedded pack area	3.5 linear inches of accessible waterer perimeter per cow	Minimum two watering locations per group.
Waterer flow rate	6 gal/min minimum	
Maintenance	Daily to Weekly	Clean parlor exit trough daily. Clean barn waterers minimum once per week.

Resources

Weather meters: https://kestrelinstruments.com/category-kestrel-basic

Foggers (fill with mineral oil): https://www.menards.com/main/outdoors/insect-pest-control/lawn-insect-control/burgess-reg-propane-powered-insect-fogger/1443/p-1444426034263.htm

Airflow indicators: https://inspectortools.com/catalog/smoke-pens-smoke-generators/

Ventilation and heat abatement resources:
https://thedairylandinitiative.vetmed.wisc.edu/home/housing-module/adult-cow-housing/ventilation-and-heat-abatement/

https://www.asi.k-state.edu/research-and-extension/dairy/heatstress.html