

Ten Essential Rules for Building a Compost Bedded Pack Barn

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We continue to see more compost bedded pack barn construction in Kentucky. As of December 2013, we are aware of 80 compost bedded pack barns in the state. Starting in 2011, we have visited and worked with many of these compost bedded pack barns. We have had the opportunity to combine our knowledge of dairy cattle and engineering with the practical experiences of dairy producers and other researchers around the world to come up with recommendations for how to construct and manage compost bedded pack barns. What follows is a list of the most important design features we want to see in a compost bedded pack barn. This is intended to be a checklist of sorts, rather than a detailed design guide. For more detailed design features, check out our factsheet titled “Compost Bedded Pack Barn Design Features and Management Considerations” at <http://www2.ca.uky.edu/agc/pubs/id/id206/id206.pdf>.

1. A minimum of 100 square feet per cow should be provided within the resting area. When compost barns are overstocked, the amount of moisture added to the pack (through manure and urine) and the amount of cow traffic compaction impedes proper composting.
2. Compost bedded pack barns should be oriented east-west. In Kentucky, our predominant wind patterns are from the south. Thus, this orientation maximizes natural winds coming across the longer side of the barn. Perhaps more importantly, this orientation minimizes the amount of time in which the sun bakes down on the cows, which encourages distribution of cows throughout the barn.
3. An open ridge vent is critical for maximizing natural ventilation. Our preference is to provide an open ridge with a cap. A continuous ridge vent opening of at least 3 inches for each 10 feet of building roof width is recommended with a minimum opening of 12 inches for barn widths of less than 40 feet. An overshoot roof can provide reasonable air removal when the opening is high enough. However, good air removal only occurs when wind moves across the higher side. When wind moves toward the opening, the wind actually forces air back into the barn.
4. Sidewalls should be constructed to allow for at least 12 feet of open space for airflow above the retaining wall or outside curb for barns that are less than 40 ft wide while a 14 ft height is recommended for barns wider than 40 ft.
5. Feed and water space is often overlooked in constructing a compost bedded pack barn. Provide a minimum of 24 to 30 inches of feed bunk space per cow, 3 feet of water tank perimeter per 15 to 20 cows, and at least 2 separate water locations per pen. Do not reduce feed and water access in an effort to build a low-cost facility.

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6. Cows will generally use the resting space provided more efficiently when they have multiple entry access points along the long side of the rectangular resting area. Concrete feed alleys should be 16 feet wide with access to the bedded pack located every 50 feet and at each end.
7. Because cows defecate and urinate more around feed and water, they should have access to waterers only on the alley side. Alley-only access minimizes excess moisture in the pack and keeps water cleaner. It also eliminates the need to alter waterer height as the pack depth changes.
8. Eave overhangs should be equal to 1/3 the height of the sidewall to minimize rain from reaching the pack and install roof gutters to reduce roof runoff from blowing into the pack.
9. Properly positioned fans help cool cows and dry bedding material. Most dairy producers have installed round or box fans or high volume low speed fans. Manufacturer recommendations for fan spacing should be consulted for fan placement. Fans should be placed to supplement and not fight natural airflow. When not enough fans are used, dead spots, with little airflow will result. Cows will not rest in these areas of the barn. Dead spots create conditions where cows bunch or congregate in certain areas of the barn. This scenario increases heat stress and impairs compost performance with excessively wet and dry areas.
10. The bedded pack is often surrounded on all sides by 2 to 4-foot walls, including a wall to separate the bedded pack from the feed alley. A concrete retaining wall provides separation between the feed alley and the pack area, which is helpful in managing pack moisture. Additionally, on the outside of the barn the retaining wall keeps bedding material within the barn. These walls may be cast-in-place concrete, moveable concrete panels, highway guardrail, or wooden panels.