

Save energy with efficient fans

WHETHER you're drawing up plans to build a new hog barn or working hard to keep the livestock cool in your existing swine facilities, management and maintenance of ventilation fans can improve energy efficiency.

Summer heat places high demands on ventilation systems. Maintaining adequate air movement is an important consideration for the health of farm employees and hogs alike. Selecting energy-efficient fans can help minimize production costs, and performing routine maintenance on new and existing fans ensures consistent air quality and efficient fan performance.

Fans are the engine of any ventilation system. Inefficient or mismanaged fans may allow air quality and quantity to diminish, causing undue stress on hogs, says Jay Harmon, ISU professor in ag and biosystems engineering. Stressed pigs are more susceptible to disease and have less-than-optimal growth and feed conversion.

In addition to heat stress, inefficient fans can add to production cost in two ways. The most obvious is wasted energy expended by an inefficient fan. Other costs include poor air quality throughout the building due to under-ventilation or wasted heat due to over-ventilation.

Fan performance important

Fan installation and ongoing maintenance greatly affect its performance. Guards generally decrease the fan performance less than 5% and should always be left in place because they protect workers from the fan and the fan from obstructions, says Harmon. Shutters reduce fan performance from 10% to 25% but are necessary for periods when the fan is not operating. Dirty shutters and blades can reduce air delivery by as much as 40%.

Regular cleaning and maintenance keep shutters operating at their manufactured level of efficiency. Well-maintained discharge cones increase fan efficiency by 15% or more. If belt-driven fans are used, check belt tension regularly. Loose belts will cause the fan to be less efficient and less effective, perhaps by as much as 50%. An overtight belt will cause undue wear on bearings. Fan ratings are based on a fan that is in a new condition and should include all accessories that will be used.

Fan efficiency is measured based on the amount of air delivery that a fan will provide per unit of electric power used, given in cubic feet per minute per watt (cfm/W). Typical range is from 5 to 25 cfm/W.

According to Harmon, a common mistake is to select fans based on fan diameter. Never assume that two fans of equal size will perform the same since different



Farm Energy

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motors, curvature of blades and other attributes greatly influence the performance.

Fans should be rated by an independent lab to show air delivery and efficiency as a function of static pressure. This information is typically presented using either a graph or table. Accessories on the fan such as guards, shutters and discharge cones impact performance and should be noted when examining test data. Test results are available from a lab at the

University of Illinois (www.bess.uiuc.edu).

More information on energy-efficient ventilation fans is available from ISU Farm Energy at farmenergy.exnet.iastate.edu. Look for "Energy Efficient Fans for Swine Production" (PM2089E) in the publication.

Petersen is program coordinator for the ISU Farm Energy Initiative, sponsored by the Iowa Energy Center.

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Keep fans running

IMPROPER fan maintenance can negate energy savings from proper fan selection. Routine management should include:

- regularly cleaning and maintaining fan blades and shutters
- maintaining discharge cones
- checking belt tension regularly
- checking with utility provider for rebates when replacing or upgrading

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