# Ventilation Systems, Efficiency, and Maintenance for Dairy Housing

Well-built and efficient fans and maintenace goes a long way in helping to achieve ventilation needs while keeping energy costs in check on the dairy.

The ventilation system on your dairy housing consumes 20% to 25% of the total energy used on the dairy. However, since air is one of the basic needs to support life it's not recommended you turn off the fans to save money. What it does mean is you need to be looking at the efficiency of those fans.

Fan efficiency is commonly measured as cubic feet per minute (cfm) of air per watt (W) of electricity consumed to give a cfm/W number. Fan efficiency is affected by several factors including blade design, fan enclosure design, and motor efficiency. Therefore, it can be said that "not all fans are created equal" and you often "get what you pay for". One example is efficient motors have more copper windings and are therefore more expensive. However, the payback on the extra capital expense may be as short as one to three years with reduce electrical consumption. There has been too much emphasis on "cheap" fans in the ag industry and this is costing more in

operating expense and maintenance. If you are looking to buy new fans, make sure you take a look at the efficiency rating of the fans as you compare. Typically, larger fan will have better efficiency than smaller fans.

Different fans are designed and manufactured for different applications. Tunnel ventilation or cross ventilation systems require a static pressure difference to be created between the inside and outside the shelter. Therefore, to design these systems you need information about fan performance tested under static pressure. When comparing fans for these type applications look for fans with a minimum efficiency rating of 20 cfm/W at 0.05-inches static pressure.

Efficiency ratings for circulation fans are also available. However, it is given as a Thrust Efficiency Ratio in terms of pounds of force per kilowatt of power (lbf/kW). Once again larger fans tend to have a better efficiency. When shopping for circulation fans you should be looking for fans with a minimum rating of 21 lbf/kW. Remember that bigger may not always be better when it comes to sizing electric motors. While a 1.5 HP motor may give a fan more thrust and or airflow in will come at a cost of electric consumption. You need to compare the cost of the additional power requirement to the possible benefit of that extra thrust.

Possibly the best thing you can do to improve the efficiency of your ventilation system is to simply maintain your fans. Poor maintenance, mostly lack of cleaning, can reduce efficiency by as much as 40%. What this means is the electric bill stays the same, but less air is moving in the barn. Those squeaking bearings, flopping belts, and dirty blades and shutters are really just robbing your power. Accumulation of as little as 1/8" of dirt on the fan blades can significantly reduce fan performance. Monthly fan maintenance and cleaning would be best, but at a minimum it should be done three to four times per year.

To keep cows, heifers and calves happy, healthy, and productive requires ventilation throughout the year and often requires fan(s). Depending of the housing type and design this may be as simple as a positive pressure tube in a calf barn for better fresh air distribution during winter ventilation or many large circulation fans in a freestall during summer to help in cow cooling. Making sure you choose well-built and efficient fans and then regularly maintaining those fans goes a long way in helping to achieve the ventilation needs of the shelter while keeping energy costs in check on the dairy.