



Grower 101:

# Operating And Maintaining Ventilation

Proper fan maintenance is one of the easiest and most cost-effective measures growers can implement to improve performance in the greenhouse. Read on to learn how you can save time and money by following these procedures.

**By Tyler Morrison**

One of the simplest and most cost-effective measures to improve fan performance in a greenhouse doesn't entail adding extra fans but maintaining the ones already running. While growers will spend extraordinary amounts of time deciding which brand of fans to put in their greenhouse, a major component often overlooked with fan selection is how easily the equipment can be maintained. Growers that take some simple and mostly easy steps can potentially save on electricity costs, as well as add extra years of service to the fans being used in the greenhouse.

## Maintenance Is Key

Frequently, exhaust fans are installed to perform a specific job for a grower. If fan performance is poor, they are no longer meeting the grower's needs. A fan is no different than any other piece of working machinery; it needs proper care and maintenance to operate effectively over a long period of time. Oftentimes, fans are overlooked during routine greenhouse maintenance until an actual problem occurs. If the greenhouse manager takes a proactive approach to maintenance, many problems can be circumvented before they become more severe and expensive.

Fans that have not been properly maintained can do more than reduce the total number of cubic feet per minute (CFM) the fan is generating. For example, when fans work harder than required, operating costs may increase due to lower efficiency. If dirty blades and shutters — or something as simple as a worn belt — are hindering a fan, the grower will pay the price out of his own pocketbook. David Loop, owner of Loop's Nursery, Jacksonville, Fla., can attest to how important regular fan maintenance can be. David is one of the many growers who takes the time to make sure all of his equipment is running properly by performing regular maintenance checks. "Fan maintenance is key for running my fans for years without problems. If we can save time and money by doing a little extra work from time to time, then that's what we will do," he said.

## Maintenance Components

**Static pressure.** Static pressure is a measurement in inches of water between the differences in pressure between the outside and inside of a structure. Fans are built to handle around 0.1-0.2 inches of static pressure and run optimally. The device used to measure static pressure is a manometer. When all fans are turned on and running at full capacity, the

*Above: Taking a proactive approach to greenhouse fan maintenance can potentially help growers save on electricity costs. (Photos: American Coolair Corporation)*

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**Left:** Keeping grass and other elements clear of exhaust fans will increase the amount of air a fan is able to pull out of the greenhouse. **Right:** Dirty blades can reduce the amount of airflow on a single fan by as much as 20-40 percent without proper cleaning.

range should be within the acceptable 0.1-0.2 inches of water. Fans will decrease their performance numbers immoderately in terms of CFM's as well as efficiency whenever static pressure rises beyond these limits. Remember, if the static pressure is decreasing the fans performance by 25 percent, the grower is wasting one out of every four fans due to poor upkeep.

**Fan cleaning.** Every fan should be cleaned as necessary to remove the dust that accumulates over time. Whenever servicing fans, be sure to turn off all electricity running to them to prevent accidents. Dirty blades can reduce the amount of airflow on a single fan by as much as 20-40 percent without proper cleaning.

Just a few ounces of dust on

the blades is enough to throw the entire fan off balance. Dust often accumulates on shutters, which drastically affects performance. Every ounce of dust on a shutter makes the fan work harder to keep the louvers fully open, which increases static pressure. When shutters are not cleaned regularly, airflow can be reduced 20-30 percent. Suggested shutter

maintenance is to clean the louvers at least once a month.

Also, be sure to lubricate the hinges with a graphite-based product and not an oil-based lubricant to prevent dirt from building up in the gel. A pressure washer may be used to clean fans as long as the motor has a totally enclosed housing. If it does not, be sure to remove the motor in

A photograph showing three white plastic bottles of Fulex Fumigators standing in a row in a greenhouse. The bottles are labeled 'Fulex', 'FUMIGATOR', and 'FUMIGATOR'. They are surrounded by red poinsettia plants. The background shows the structure of the greenhouse with its plastic covering and metal frame.

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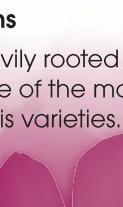

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order to not get unwanted moisture into the motor windings.

**Belt replacement and adjustment.** A fan belt should be checked every time general fan maintenance is issued. The fan belt is in constant motion while a fan is running, therefore it can be susceptible to wear and tear.

When checking a belt, the first task is to make sure the belt has retained its "V-shape." If the belt has more of a "U-shape," it is time to replace the belt with a new one. If belts are cracking or fraying, replace them immediately. While checking belts, be sure to also check belt tension. When belts are too tight, they can hinder fan performance, as well as speed up the break-down process of the fan and rapidly shorten its lifespan. The proper tension for a V-belt is the lowest tension that prevents the belt from slipping under peak load conditions.

**Pulleys.** Without the proper pulley designed to go with your fan and motor speed, a grower may be unknowingly shortening the lifespan of his or her fan and reducing its efficiency. It is key

that pulleys are replaced with the same type of pulley that originally went with the unit. If a grower is uncertain of what type he has, a quick call to the fan manufacturer is all that is needed.

On fans supplied with adjust-

able pitch motor pulleys, it is important to keep the same pitch settings that were determined by the factory. The pitch setting made at the factory operates the fan at the proper motor load set for peak performance. When a pulley is off

of its designed pitch setting it will rub against the fan belt and cause the belt to fail over time.

**Housing issues.** For optimal use of a ventilation system, it is crucial for the building to not have any leakage through small

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A fan is no different than any other piece of working machinery; it needs proper care and maintenance to operate effectively over a long period of time.

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openings. Over time, cracks may become a problem and need to be sealed as quickly as possible.

There is a quick test that can be conducted to find out if there is a leakage problem. Close all inlets in the house and turn on one fan.

Then use a manometer to read the static pressure. If the static pressure reading is around 0.20, it is safe to say that the house does not have a problem with leakage. If the static pressure is less than 0.15, the house may need to be

inspected for areas where air is unwontedly entering. A house without any noticeable air leaks will be more likely to perform in the way for which it was designed and maximize the strength of the fans being used.

### Additional Recommendations

When reviewing greenhouse ventilation, it is not only important to look inside for problems. The exterior of a building also can cause ventilation problems if left unchecked. It is important to make sure there is no immediate obstruction to the airflow of exhaust fans. If there is any tall grass or shrubbery it should be removed so air can flow freely outside the greenhouse. Removing any outside obstructions can improve fan efficiency by 3-7 percent.

After all fan maintenance has been completed, it is recommended that the serviceman place a sticker on the fan showing the current date and who performed the maintenance. Also, record all maintenance in a master log that is readily available for the grower to reference at any time. Although these steps may seem inconsequential at the time, having years of service records will provide information to anyone in the future who may question how well a greenhouse was kept.

There are a few greenhouse fan maintenance tips that may not be as obvious as others, but the majority of them are very straightforward. The reason that fans will go unkempt in houses is because some growers do not acknowledge there is a problem until something calls attention to it or it breaks down. A good maintenance man can potentially be a huge money saver for the farm if he follows the procedures highlighted in this article. Shutters, fan blades and belts will all wear out over time and need to be replaced. Individual growers have the responsibility of determining how much life they will be able to squeeze out of their equipment. For growers already dealing with slim profit margins, it is wise to think economically and try to get the best performance from their fans for as long as possible. **GPN**

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