The *Poultry Engineering, Economics & Management*
NEWSLETTER

Critical Information for Improved Bird Performance Through Better House and Ventilation System Design, Operation and Management

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Keys to Top Evaporative Cooling Performance

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Farms all across the Broiler Belt are already experiencing temperatures in the lower 90's. Summer is approaching fast. Are your evaporative cooling systems ready? Have you cleaned your pads? Are your system filters cleaned? Distribution holes unstopped? If not, the time to get started is now. This newsletter focuses on the most important things you can do to make sure you get all the cooling you expect (and paid for) and the life span that you had in mind when the system was purchased.

Working with evaporative cooling systems, like most things in the poultry business, is a "time-on-task" situation. The more time you spend servicing your system the better it will perform and the longer it will last. It's essential to put in the time to make sure the entire system is in top shape before hot weather arrives. Then throughout the cooling season, you should be monitoring system performance closely, checking for problems at least weekly if not daily, and carrying out routine maintenance jobs as needed. Whether you have 4- or 6-inch evaporative cooling systems, the care and maintenance is about the same.

Water Supply

Most poultry farms use on-farm wells, which often provide a hard water with sediment or rock particles that will require attention and maintenance in keeping filters cleaned, pH corrected, and sometimes backup tanks cleaned out so that the evaporative system works properly. Several water purification systems on the market are of great help to those with poor water sources, and chemicals that can be added to improve water quality, which may also make it possible to get by with a lower cost purification system. The cost of these systems, however, may be a limiting factor. Whatever the source, an adequate pumping rate must be maintained. It is very important to monitor systems for leaks, perform any required well pump maintenance, and test and maintain backup systems. Running out of water can cause catastrophic problems in very hot weather. The type and timing of maintenance on water system equipment vary according to the particular setup and situation.

Recirculation Pumps

The recirculation pumps are vital to keeping pads fully wetted during operation. Pumps and sumps should be cleaned several times during the months of summer operation to prevent algae and sludge or sediment clogging that causes reduced water pressure across the distribution header and poor, non-uniform pad wetting. Extreme clogging can cause the entire system to fail and recirculation pumps

Dry areas on a cooling pad are like open doors pouring hot air into the house. Light-colored areas on a pad are dead giveaways to clogged distribution headers, most often caused by operating without a filter or not doing required maintenance on the system. Dry areas are more often seen at pad ends because sediment or trash in the water tends to get pushed to the end of the pipe.

to burn out. Reliable recirculation pumping is so important some growers use two pumps on each system. Where there is only one pump, paying attention to maintenance is especially critical. Sump pump levels should also be checked and adjusted if needed to make sure enough water is available for good cooling.

Water Storage and Collection

An evaporative cooling system needs to have enough water storage to keep the pads fully wetted while the system is running. A typical 6-inch system needs about 0.75 gpm flowing over the pad per linear foot. So for 50 feet of pad you will need to be recirculating 37.5 gpm over the pad. Water that is evaporated must be replaced, but this is much less, usually ranging from 6 to 10 gpm, depending on the weather. To save water and pumping costs, make sure your system is not losing water through leaks in the plumbing or troughs. Cracked troughs must be repaired. Sagging troughs must be adjusted so that all water runs back toward the sump or storage system. Most manufacturers recommend bleeding off water in the system or replacing the water at least once a week during heavy usage to maintain quality water in the system.

Key Cooling System NEVER's

1. **Never use unapproved cleaners such as Clorox, bromine-containing chemicals, or weed killers like Roundup or Eraser on pad systems!**
2. **Never use power washers or high pressure cleaners to clean pads!**
3. **Never operate an evaporative cooling system without filters!**
4. **Never operate cooling systems 24 hours a day! Pads must be allowed to dry out at least once per day.**
5. **Never allow grass clippings, trash or even dust to be blown toward evaporative cooling pads!**

Filters

Keeping water filters cleaned can be one of the most time consuming problems, especially for growers with poor water quality. Filters do put a load on recirculating pumps, and when they start getting clogged they reduce water pressure in the distribution pipe and cause under wetted pads, so they must be regularly cleaned out or replaced. Filters, in other words, can seem like a big nuisance. However, taking the filters out of the system is NOT the solution. Not having filters creates much worse problems. Without filters, mineral scale, algae and sludge deposits will very quickly stop up header holes and build up on pads, presenting a much more difficult and time-consuming maintenance problem and reducing the useful life of the pads in particular. Keeping filters cleaned and working is very important for system cooling efficiency and longevity.

Distribution or Header Pipes

Maintaining fully functioning distribution headers, with water coming out evenly along the entire length of the pipe, is also essential for good cooling. It is easy to spot clogged holes in the pipe because there will be a dry column underneath the clogged section. This is easily corrected by unclogging the hole with a screwdriver or nail small enough to fit into the hole. If the problem is severe or keeps happening, flushing the pipe is necessary to remove any algae or foreign bodies in the system that are causing the problem. Sagging pipes must be adjusted and fixed so that the water is being sprayed evenly across the top of the pad.

Pads

Without fully wetted, undamaged, and unclogged pads the system cannot deliver the degrees of cooling it was designed (and you paid) for. Dry spots or streaks on pads allow uncooled air to enter the house, greatly reducing efficiency and cooling. Clogged pads can severely restrict airflow and elevate static pressure in the house, so that not only will cooling be reduced, the ventilation system will not be able to do its job of removing heat from the house. To reduce algae growth and extend pad life, systems should be turned off and pads allowed to dry out at least once every 24 hours. When consistent system maintenance is not practiced, the pads are often the first thing to go. They are easily damaged by harsh chemicals, rocks from lawn mowers, pressure washers, and mineral or algae buildup, so we must pay attention to how we are treating them in and out of season. It does not matter what brand you use, if you do not take care of them they will not perform or last.

Key Steps for Getting Maximum Cooling from Your System

Before putting the cooling system into operation:

1. Make sure your system is getting the cleanest water you can get for it, free from harsh chemicals, minerals, and foreign bodies.
2. Clean sumps and troughs thoroughly per manufacturer recommendations.
3. If the system has scale or mineral buildup present on the pads, use a soft bristle broom or car cleaning brush to dislodge it from the pads before wetting the pad. Carefully sweep the pads with the brush in the same direction of the pads' manufactured grain in an up and down motion, removing the loose debris and NOT damaging the

Dirty water leaves all its dirt on the pad as the water evaporates. This water needs to be dumped and the system cleaned out. Usually, system water should be dumped and replenished on a weekly basis.

Clogged pads cause severely reduced cooling, increased electrical costs, and poor feed conversion and flock performance; not to mention decreased pad life if the problem is not corrected.

Clogged holes in distribution headers can often be cleared by poking a small screwdriver or other tool into the hole to remove the foreign matter.

Operating an evaporative cooling system without a filter installed is inviting disaster. Even if water quality is good to start with, any minerals or particles in the water, plus any dust or trash that inevitably gets into the trough, will be more and more concentrated in the system water as more and more water is evaporated off of the pad. If filters are removed, the buildup of sludge will quickly and severely clog the pads. Keep filters installed and check and clean them weekly unless experience shows this can be done at longer (or shorter) intervals. If filters are allowed to become clogged they will reduce water flow and allow the pads to dry, which then allows hot air to enter the house.

Grass clippings, leaves, dirt, and other materials must not be allowed to collect on pads. Buildup like this will stop up a filter in a matter of seconds if allowed to enter the system water storage.

A soft bristled brush similar to the ones used to clean automobiles can be used – carefully – to clean pads without damaging them.

Using a low pressure water source and a spray nozzle can effectively dislodge plugs of buildup in the pads that a brush cannot reach.

pad. Using a low pressure water hose and spray nozzle can also help loosen and remove buildup on clogged pads, but make sure you are not damaging the pads while doing so. Pressure washers must NOT be used.

4. Flush distribution header pipes and unclog any stopped up holes in the pipe.
5. Remove the pump, clean the intake on the pump and make sure the float is working properly.
6. Remove and clean the filter, replacing it if necessary. It is a good idea to have a couple of extra filters on hand.
7. Refill the trough to the desired water level, power up the pump and make sure that there are no restrictions or leaks in the system. After the system operates long enough to fully wet the pads, add a cleaning agent approved by the pad manufacturer at the correct dosage for your system. Follow the directions listed on the cleaning agent for the system run time. Check the pads for full and uniform wetting. If the system requires additional cleaning, repeat Step 3.

During the cooling season:

1. Monitor system performance frequently (daily is not too often), checking for any leaks and for dry areas on pads. Clean pads as needed.
2. Dump old system water and replace with fresh, clean water on a weekly basis unless experience or manufacturer recommendations indicate otherwise.
3. Clean troughs and sumps at least weekly. Dirty water makes dirty pads!
4. Check and clean or replace filters weekly, unless water quality is good and experience shows it can be done less often.
5. If rapid mineral scale or algae buildup on pads is a problem, use a water conditioner or algaecide. Some require frequent dosages, usually weekly while others utilize extended release for convenience purposes. Note that if you bleed off water from the system, then additional cleaner must be added to keep the solution within the recommended limits.

The Bottom Line

Regular preventative maintenance of evaporative cooling systems is essential for reliably getting top cooling. Further, if regular maintenance is not done, irreversible damage to the system, especially the pads, is likely. Cooling system maintenance is not that hard a job, and the real cooling of incoming air to a poultry house we get from a properly operating system is too valuable to flock performance to risk losing. Cooling systems are expensive, so make sure you get what you paid for. Take care of your evaporative cooling system, and it will take care of you.

U.S. Poultry & Egg ASSOCIATION

This newsletter is produced in cooperation with the U.S. Poultry & Egg and Alabama Poultry & Egg Associations, as part of their commitment to poultry industry education. We appreciate their support and are proud of our relationships with these organizations.

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ALABAMA COOPERATIVE Extension SYSTEM

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