

## MAXIMIZING COOL CELL PAD EFFICIENCY AND LIFE SPAN

**E**vaporative cooling systems play a pivotal role in maintaining ideal temperatures for bird performance during hot summer months. Cool cell pads require a significant investment of about \$21 per pad or \$5,000 per house. Without proper maintenance pads will require more frequent replacement and deliver decreased performance during the flock.

By understanding the variables that challenge pad performance and longevity the most, producers can proactively maximize their investment.

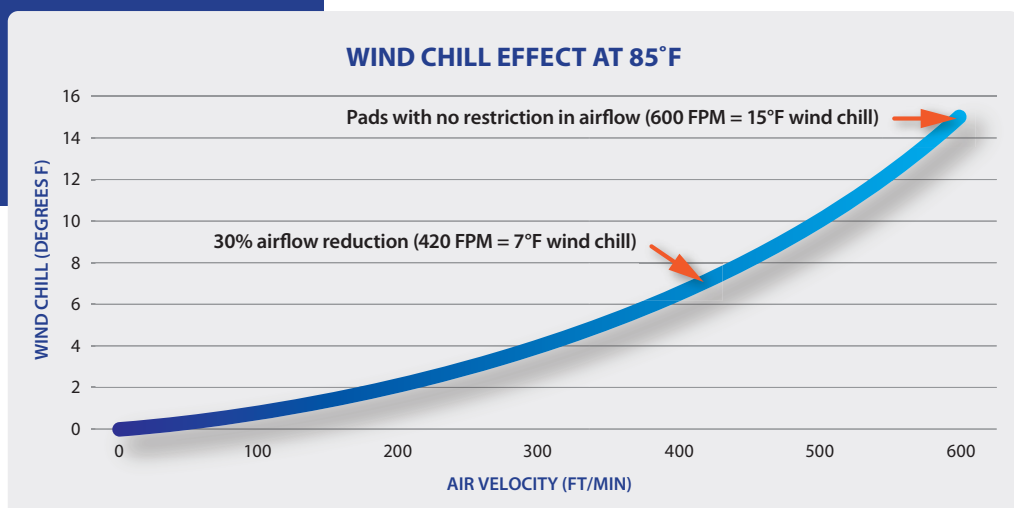
### SMALL DECREASES IN AIRFLOW, BIG LOSS OF WIND CHILL EFFECT

Pad performance can be lost for several reasons. Dirt and dander can build up in pads without thorough cleaning of the dog house two times yearly. Feathers and spider webs are particularly a challenge as they can restrict the amount of air tunnel fans are able to pull through pads. Even pads that appear clean from a visual inspection should be removed (if possible) blown down and then cleaned with low pressure spray since the most significant airflow blockages aren't always easily visible.

Even a small decline of airflow through pads due to dirt and dander can significantly lower the wind chill effect of the system. In this example, a decline in pad condition caused airflow to drop from 750 to 650 FPM – a 13% decrease in air velocity.

While this decline may seem small, wind chill is nonlinear meaning that a 13% loss in airflow equates to a loss of 6 to 7 degrees of effective temperature. Essentially, this house is losing 30+% of its cooling potential.

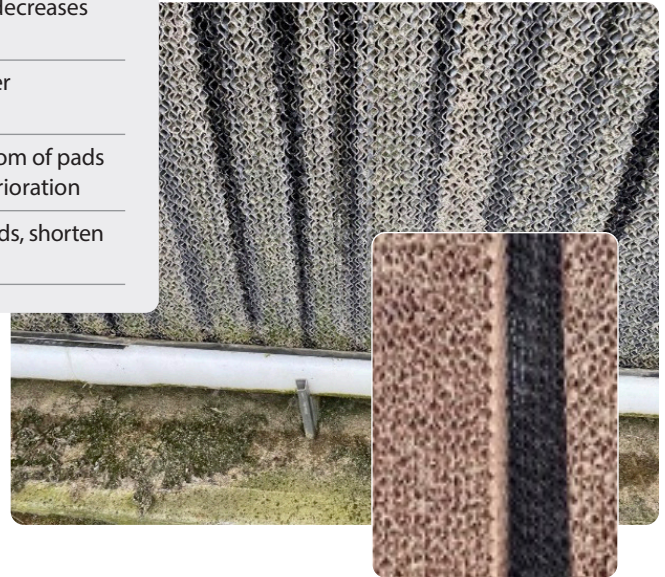
*Pad performance can also decline if basic system maintenance is not completed.*



## COMMON MAINTENANCE ISSUES THAT IMPACT PAD PERFORMANCE

ISSUE	RESULT
Clogged pipes	Water unevenly dispersed, decreases cooling efficiency
Leaking pumps (water puddled at base, runoff between houses)	High water bill, wasted water
Water level in sumps	Too much water keeps bottom of pads constantly wet, causes deterioration
Hard water / heavy buildup of scale in sumps and reservoir tanks	Rapid buildup of scale on pads, shorten life of pads

*Example of bad scaling, trough water level being too high and clogged pipes/filter leading to uneven water disbursement on pads*



## IMPACT OF WATER QUALITY ON COOL CELL PADS

Water quality is one of the biggest driving factors that affect the longevity of cool cell pads. Cleaner water typically means cleaner pads. However, even clean water can lead to damaged pads if pads are not properly maintained.

The composition of the water (mineralogy, alkalinity) should dictate how pads are maintained.

Evaporative cooling systems cool birds through the wind chill effect as tunnel fans pull air through wet cool cell pads. As the pure water is evaporated from pads and used to cool birds, minerals in the water are left behind. More minerals in the water means more mineral build up (scaling) will occur.

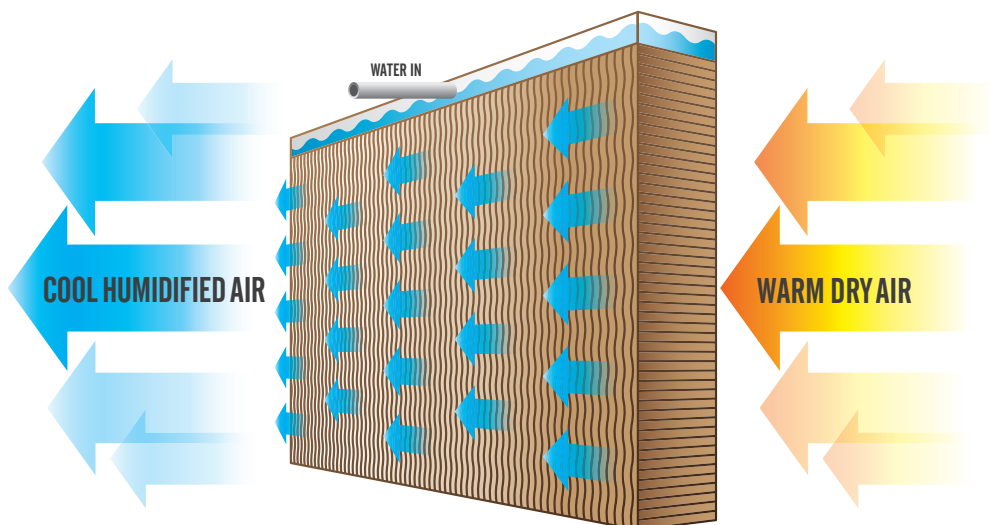
Evaporative cool cell systems have the potential to go through a tremendous amount of water. Depending on the size of the cool

cell system and runtime, as much as 3,000 gallons of water can evaporate from the entire system each day. Overtime, the concentration of minerals can increase tremendously and may become corrosive to the pads, destroy their rigidity, and/or buildup on the pads themselves turning them into rocklike slabs.

Water quality analyses are the best way to identify the severity of mineral buildup a farm is likely to face. There can be significant differences between every well on a single farm, so for greatest accuracy, water from each well should be tested. Fresh water samples should be taken from as close to the source as possible. Water left in the evaporative cooling system trough for too long can magnify mineral challenges.

The water challenges that are most likely to impact cool cell pad performance and mineral scale buildup are alkalinity, calcium and magnesium as with the sample below.

Alkalinity is defined as the buffering capacity of water or its ability to maintain a stable pH. Ideal water pH for pads is between 6 (slightly acidic) and 8 (slightly caustic). Alkaline water typically has a pH of 8 or 9 and contains bicarbonates, carbonates, sulfates or hydroxides that, when deposited after water evaporation, can become concentrated and increase the pH of the water being recirculated. Magnesium is one mineral in alkaline water linked to scaling.



The impact of this degree of hard water is visually evident on many farms. For example, hard water on this farm caused approximately ½ lb of calcium to accumulate over a 100 ft. section of pads per day. During an eight-week flock, that equals 15 lbs. of calcium buildup. Mineral buildup is often seen on the bottom of pads first.

SAMPLE	CONCENTRATION								
	HARDNESS	pH	Al aluminum	B boron	Ca calcium	Cu copper	Fe iron	K potassium	Mg magnesium
FARM X	176	8.0	<0.10	<0.01	62.1	<0.05	0.33	2.10	5.03
SUMP 42x500 80 COOL	900	7.6	<0.10	0.66	229.7	<0.05	0.12	102.12	79.33
SUMP MEGA 120 COOL	1226	8.4	<0.10	0.25	236.6	<0.05	0.10	187.80	154.27

Iron, another mineral many farms commonly struggle with, can corrode equipment, including the filters in evaporative cooling systems. Iron frequently results in red water but not all red stains are the result of corrosion. In some cases, water from some formations contains considerable iron in solution, which, on being exposed to the air, precipitates readily and gives a red-water effect.

When iron builds up on filters, pipes and other areas of the system, it serves as a food supply for bacteria and can result in thick algae or biofilm that can clog pads and pipes. More algae growth is seen on farms with water outside the target pH range of 6.5 to 8.5 as well as north facing houses due to less sun exposure.

## MAINTENANCE IS THE BEST DEFENSE

Given the cost of cool cell pads and the variety of challenges to their performance and longevity, producers must be proactive in maintaining their pads.

As we head into the hot summer months, keeping a proactive approach to maintaining cool cell pads will work to lengthen their efficiency and overall longevity for many flocks to come.

For farms with hard water, carefully following these eight steps is even more crucial as mineral scale will accumulate faster. Cleaning cool cell pads can be one of the more time intensive tasks on a farm, taking between three and five hours per house.

Producers can work to extend the life and maximize the efficiency of pads on farms with hard water by adding SWASHCOOL-CELL™ to clean sump water during the last two to three weeks or in between flocks for maximum efficacy. On farms not challenged with hard water, SWASHCOOL-CELL™ can be added at any time. The product contains three separate agents that work as a multi-faceted, single application solution balance water pH, keep minerals bound in solution and prevent dust and dirt build up on pads. For users, this allows them to:

- Remove/slow mineral scale buildup and stains from algae to improve airflow and system efficiency
- Shorten cleaning time, allowing for adequate cleaning between flocks or groups even with tight turnaround times
- Reduce drying time between cycles, keeping pads drier for longer so they can quickly return to full cooling capacity without developing algae stains

### MAINTENANCE GUIDANCE

1. Dump dirty water and remove any debris from the sump
2. Check all pump screens and filters for cleanliness
3. Inspect pads for damage, degradation and cleanliness
4. Replace any pads with excessive damage
5. Use low-pressure water to rinse both sides of each pad
6. Clean all frames and gutters — the cleaner the entire system, the better it performs
7. Flush the entire system with clean water and ensure proper water distribution to every part of the cool cell pads
8. Ensure pads have enough time to dry between cycles

