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## **Maintenance of Evaporative Cooling Systems**

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For evaporative cooling to function, the water handling equipment components of evaporative cooling systems need to be kept relatively clean. Different maintenance procedures will be required depending upon the type of system being used. To discuss maintenance procedures, evaporative cooling systems are divided into three major categories:

1. Sprinkler systems – Any type of water emitting device whose purpose is to spray or drip water on pigs to increase evaporative cooling. Commonly used sprinklers include drippers, sprinkler nozzles and soaker or sprinkler hoses.
2. Pad systems – Evaporative cooling pads of various types that have water running down and over the surfaces and allow water to evaporate from the surface to cool the air entering a building.
3. Fogger systems – Any type of low-pressure (less than 50 psi) or high-pressure (up to 200 psi) nozzle that sprays water into the air as a fine mist or fog. The fine mist or fog evaporates into the air to cool the air in the vicinity of the fogger.

### **Water Quality Impacts**

Regardless of system type, water quality can and often does have an impact on cooling system maintenance requirements. Improving water quality when possible will reduce cooling system maintenance.

An evaporative cooling pad system evaporates water into the air to reduce the temperature of the inlet air. Since the water evaporates off the pad, all salts and minerals will be deposited on and in the evaporative cooling pad. These salts and mineral build-ups need to be removed to maintain the pad itself. Evaporative pads using water with lower hardness levels will have less maintenance requirements and a longer life expectancy than pads using harder water unless routine cleaning of pads is performed. A water softener will change the kind of salts that are in the water to ones that should be easier to clean from the cooling pads. However, if a water source without the initial hardness, such as a surface water source, is used, cleaning requirements for evaporative cooling pads will be reduced.

Fogger systems are typically more adversely affected from hard water than pad systems. Water will often evaporate directly on the nozzle leaving the mineral deposits directly on the nozzle outlet. Some high-pressure nozzle systems using hard water will require daily cleaning of the nozzles to ensure a functioning nozzle system. Most sprinkler type systems are not adversely affected by hard water. Any sediment not filtered out of the water supply will clog a sprinkler or fogger nozzle. All water supplies used for evaporative cooling should have a filter located in the supply line to minimize any sediment clogging problems.

### **Sprinkler System Maintenance**

Sprinkler systems typically have the lowest overall maintenance requirements. Below is a list of basic maintenance steps or procedures to use for sprinkler systems.

1. Periodically check filter and remove sediment buildup. Should check filter at least monthly or more often if water has significant sediment amounts.
2. On a daily or at least on a weekly basis, check the flow from each emitter or nozzle to ensure water flows from each one. Clean or replace any non-functioning emitter or nozzle.
3. Check operating pressure on a weekly or at least a monthly basis to ensure sprinklers are operating at desired pressure. If pressure is too high, sprinklers may operate more like foggers than sprinklers.

### **Pad System Maintenance**

Pad systems can be relatively maintenance free depending upon the operational and installation parameters of the system. Below is a list of basic maintenance steps or maintenance reduction ideas for pad systems.

1. Allow pad to dry for a minimum of 4 hours each night to reduce algae growth and help maintain pad life.
2. Periodically check filter and remove sediment buildup. Should check filter at least monthly or more often if water has significant sediment amounts.
3. When daily drying is not adequate to control algae growth, add a chemical for algae control on a weekly basis if algae growth is a problem. Shading outside of pad system can help reduce problematic algae growth on pad.
4. Reduce mineral buildup on pads by:
  - a. Ensuring water is uniformly distributed along length of pad.
  - b. Increasing the water flow rate wetting the pad (extra flow rate will tend to wash pad while keeping pad wet).
  - c. Periodically cleaning and flushing distribution, sump and pump system.
  - d. Bleed off water from sump storage tank on regular basis. Water in sump will tend to have higher mineral concentrations than supply water mineral concentrations.

5. Clean pads in spring before cooling season and in fall at end of cooling season. Pads using a water re-circulation system can be cleaned using the following basic steps:
  - a. Drain sump storage tank and refill with fresh water.
  - b. Remove the screen from the inlet to the sump pump.
  - c. Add a chemical cleaning solution to the sump storage tank.
  - d. Turn on sump pump and run for at least one hour to wet and soak pad.
  - e. Ensure entire pad has been soaked.
  - f. After entire pad has been soaked, shut off sump pump.
  - g. Rinse pad from top to bottom with fresh water using a low pressure nozzle on a pressure washer with the water pressure set low enough not to damage pad.
  - h. After cleaning pad is complete, drain and rinse sump storage tank.

### **Fogger System Maintenance**

Fogger systems may require daily maintenance depending upon quality of water and type of system. Low-pressure fogger systems (less than 50 psi) will tend to require less maintenance than a high-pressure fogger system (up to 200 psi). Below is a basic list of maintenance steps for fogger systems:

1. Periodically check filter and remove sediment buildup. Should check filter at least monthly or more often if water has significant sediment amounts.
2. Check operating pressure on a weekly basis to ensure nozzles are operating at desired pressure.
3. Check all nozzles on a daily basis to ensure all nozzles are functioning and clean clogged nozzles or replace if necessary.
4. If nozzles require cleaning often (typically on a daily basis when using a high pressure system), keeping an extra set of nozzles allows the system to be kept operational while allowing for cleaning of dirty nozzles. Mineral buildup on nozzles can be removed easier by soaking the dirty nozzles in vinegar or some other mild acid to soften and/or remove the mineral buildup.