

Munters

Evaporative Cooling Division

ENGINEERING BULLETIN

MB-ACP-205

PREVENTING ALGAE IN EVAPORATIVE COOLING PADS

Algae needs three essential elements to survive, **light, moisture and nutrients.**

SHADE THE PAD AND SUMP

Algae only needs sunlight for a few hours each day. If sunlight can be minimized, the growth period will also be shortened. Remember to cover the sump. Algae may be growing there, too.

Locate pads inside the pad house away from direct sunlight. If there is no pad house, erecting a barrier of shade cloth or awnings will inhibit algae growth.

Cover the sump to keep out dirt and light.

Do not use clear or translucent hoses, tanks, or water distributors.

If inlet louvers or curtains are used, a dark color will reduce the sunlight.

ALLOW THE PADS TO DRY COMPLETELY ONCE EVERY 24 HOURS

Algae cannot live when it is bone dry. Regular drying of the pads for several hours at a time will stop algae growth. Minimize the number of drying cycles, though. Too many will weather the pad. During the cooling season, they should cycle once each day.

Set automatic controllers so the water to the pads turns off before the fans turn off. Pad pumps should be turned on last and turned off first.

Do not allow the bottom of the pads to set down in the water when the system is not running. Adjust the float valve and overflow after the system shuts down and all of the water returns to the trough.

MINIMIZE NUTRIENT CONTAMINATION

Algae feeds off the nutrients in the water and air, not from a "good" cooling pad. Look for sources of nutrients and try to eliminate them.

Nearby farm fields and roads contribute dust and fertilizer which can be drawn into the pads.

Injectable fertilizers find their way into the pad via sprinkler systems. Do not allow sprinklers to spray into the pad or sump.

Feed hoppers should not be located near the pad wall.

When cleaning pads, remove from the pad wall. Old algae growth should be cleaned and removed from the system. When the pads are cleaned, algae and dirt are usually flushed into the gutter and go back to the sump. If it is not removed, it will serve as a nutrient for the next crop of algae.

Remove spent, rotted media pads as they may decompose to form nutrients.

Do not use phosphate type scale control agents or detergents in the pads. They degrade to form phosphate type nutrients.

Use water from deep wells or municipal supplies. Surface water from lakes and shallow wells may be high in nutrients.

Do not allow exhaust air from other processes to blow into the media. Volatile organic compounds from kitchens, paint shops, and furnaces can be absorbed into the recirculating water.

Since it is impossible to keep all nutrients out of the evaporative cooler, flush the pads, gutter and sump

COMMON ALGAE TREATMENT CHEMICALS

Continuous use of algae treatment chemicals is not recommended. Besides being potentially harmful, they will not control algae without periodic cleaning and flushing of the system. Housekeeping and preventative tips are outlined in Engineering Bulletin MB-ACB-205, ***PREVENTING ALGAE IN EVAPORATIVE COOLING PADS***.

After cleaning and flushing the evaporative cooling system, according to Engineering Bulletin MB-SCP-201, ***CONTROLLING SCALE AND DIRT IN EVAPORATIVE PADS***, it can be treated with certain algae control chemicals. There are many control chemicals commercially available. Most contain one, or a combination of, certain active ingredients. Read the label to determine the nature of these ingredients. Never use any chemical which is not labeled for use in evaporative coolers or do not list the ingredients. Remember, there are no miracle chemicals.

The three most common chemical groups are quaternary amines, oxidizing biocides and copper compounds.

Examples of the **quaternary amines** are:

- Octyl Decyl diMethyl **Ammonium Chloride**
- Alkyl diMethyl Benzyl **Ammonium Chloride**
- n-Alkyl diMethyl Ethyl Benzyl **Ammonium Chloride**

Combinations of these chemicals are found in many swimming pool chemicals and commercial disinfectants. If used in evaporative coolers, dosage should be maintained between **30** and **50 PPM**.

Examples of the **oxidizing type biocides** are:

- sodium **hypochlorite** (Clorox)
- solid calcium **hypochlorite** (HTH Pool Tablets)
- diMethyl **Hydantoin** (AgraBrom)
- Ethyl Methyl **Hydantoin** (DantaBrom)
- Hydrogen **Peroxide** (Baqua Shock, Pool Treatment)
- Potassium **peroxymonosulfate** (Oxy-Bright)

These products when used continuously or in too high of concentrations, can destroy wood, cellulose and metals. The concentration must be maintained between **1 and 2 PPM**. For bleach, HTH and other forms of hypochlorite, the water pH must be maintained less than 7.5 or it will have no effect on the algae.

Copper compounds:

- Copper is effective for killing algae. However, it is not usually sold as a general disinfectant because it is not effective against bacteria. Copper is also extremely **corrosive**, and therefore should not be used in systems containing stainless steel, galvanized steel or

CALCULATING DISINFECTANT DOSAGES

Whenever disinfectants or algaecides are used to clean evaporative cooling pads, it is very important to use the correct dosage. Too much of any chemical, (especially oxidizing biocides) may burn the pads as well as corrode the pumps and gutters.

Correct dosage can be estimated as follows:

$$\text{Dose Size (Fluid Ounces)} = \frac{\text{Desired PPM} \times \text{Sump Capacity (Gallons)}}{\text{Percent Active Ingredient} \times 78}$$

For instance, when treating a 250 gallon sump with chlorine bleach (5.25% active)* to a concentration of 2 PPM use the following dose:

$$\text{Dose Size} = \frac{2 \text{ PPM} \times 250 \text{ Gallons}}{5.25\% \times 78} = 1.22 \text{ Fluid Ounces}$$

Conversely, if the entire gallon of chlorine bleach was poured into the sump, the concentration would be:

$$\frac{5.25\% \times 78 \times 128 \text{ Fluid Ounces}}{250 \text{ Gallons}} = 210 \text{ PPM}$$

This is way too much chlorine! So, be careful when disinfecting pads and reservoirs, because overdosing is easy.

*Commercially available chlorine laundry bleaches have an active chlorine concentration of 5.25%.

MAXIMUM RECOMMENDED DOSAGES	
Quaternary Amines	30-50 PPM
Oxidizing Biocides	1-2 PPM
Coppers (Not Recommended)	
<i>If the chemical manufacturer recommends a different dosage, use the lesser amount.</i>	