

## **PROTOZOA (FLAGELLATES) - CHLAMYDOMONAS, ETC.**

### General Information

#### INSTRUCTIONS FOR USE

Water hardness, temperature of the water, the type and amount of vegetation to be controlled, and the amount of water flow are to be considered in using Copper Sulfate Crystals to control algae. Begin treatment soon after plant growth has started. If treatment is delayed until a large amount of algae is present, larger quantities of Copper Sulfate Crystals will be required. Algal growth is difficult to control with Copper Sulfate Crystals when water temperatures are low (less than 60°F) or when the water alkalinity is above 50 ppm. Larger quantities of Copper Sulfate Crystals will be required to kill and control algae in water which is flowing than in a body of stagnant water. If possible, curtail the flow of water before treatment and hold dormant for approximately three days after treatment or until the algae have begun to die. When preparing a Copper Sulfate Crystals solution in water, the mixing container should be made of plastic, glass, or a painted, enameled, or copper-lined metal container. It is usually best to treat algae on a sunny day when the heavy mats of filamentous algae are most likely to be floating on the surface where they can be sprayed directly. If there is some doubt about the concentration to apply, it is best to start with the lower concentration given in the Specific Instructions below.

Treatment of algae can result in oxygen loss from decomposition of dead algae. This loss can cause fish suffocation. Therefore, to minimize this hazard, treat no more than one-half of the water area in a single operation and wait at least 14 days between treatments. Begin treatments along the shore and proceed outward in bands to allow fish to move into untreated water. NOTE: If treated water is to be used as a source of potable water, the metallic copper residual must not exceed 1 ppm (4 ppm Copper Sulfate Crystals).

CALCULATIONS FOR THE AMOUNT OF WATER IMPOUNDED AND FOR THE AMOUNT OF COPPER SULFATE CRYSTALS TO BE USED: Calculate water volume as follows: (1) Obtain surface area by measuring of regular shaped ponds or mapping of irregular ponds or by reference to previously recorded engineering data or maps. (2) Calculate average depth by sounding in a regular pattern and taking the mean of

these readings or by reference to previously obtained data. (3) Multiply surface area in feet by average depth in feet to obtain cubic feet of water volume. (4) Multiply surface area in acres by average depth in feet to obtain total acre-feet of water volume.

**CALCULATE WEIGHT OF WATER TO BE TREATED AS FOLLOWS:** (1) Multiply volume in cubic feet by 62.44 to obtain total pounds of water, or (2) Multiply volume in acre feet by 2,720,000 to obtain pounds of water.

**CALCULATIONS OF ACTIVE INGREDIENT TO BE ADDED:** To calculate the amount of Copper Sulfate Crystals needed to achieve the recommended concentration, multiply the weight of water by the recommended concentration of Copper Sulfate Crystals. Since recommended concentrations are normally given in parts per million (ppm), it will first be necessary to convert the value in parts per million to a decimal equivalent. For example, 2 ppm is the same as 0.000002 when used in this calculation. Therefore, to calculate the amount of Copper Sulfate Crystals to treat 1 acre-foot of water with 2 ppm Copper Sulfate Crystals (or 0.5 ppm metallic copper), the calculation would be as follows:  $0.000002 \times 2,720,000 = 5.44$  lbs. Copper Sulfate Crystals.

Limitations, Restrictions, and Exceptions

#### APPLICATION METHODS TO CONTROL ALGAE IN IMPOUNDED WATERS, LAKES, PONDS AND RESERVOIRS

There are several methods by which to apply Copper Sulfate Crystals to impounded water. Probably the most satisfactory and simplest method is to dissolve the Copper Sulfate Crystals in water and to spray this water over the body of water from a boat. A small pump mounted in the boat can easily be used for this purpose. Fine crystals may be broadcast directly on the water surface from a properly equipped boat. Where the situation permits, Copper Sulfate Crystals may be applied under the water by dragging burlap bags containing Copper Sulfate Crystals. The crystals are placed in burlap bags and dragged through the water by means of a boat. Begin treatment along the shoreline and proceed outward until one-third to one-half of the total area has been treated. Care should be taken that the course of the boat is such as to cause even distribution of the chemical. Continue dragging the burlap bags over the treated area until the minimum dosage is achieved and all crystals have been dissolved. Large or medium size crystals that dissolve slowly should be

used with this method. Note: EPA sets the maximum application rate at 4 ppm Copper Sulfate Crystals (1 ppm metallic copper); however, 1 to 2 ppm Copper Sulfate Crystals can be used to treat most genera of algae. Minimum retreatment interval is 14 days.

Use the lower recommended rate in soft waters (less than 50 ppm methyl orange alkalinity) and the higher concentration in hard waters (above 50 ppm alkalinity). Always consult State Fish and Game Agency before applying this product to municipal waters.

Method

[Spray](#)

Rates

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Timings

[Soon after plant growth has started.](#)