

Mizzen

Algaecide



For use in Fresh Water Lakes, Potable Water Reservoirs, Ponds, Fish Hatcheries, Irrigation Ditches and Other Slow Moving Bodies of Water. Also for use in Irrigation Systems and Other Moving Water.

Active Ingredient:

Copper Triethanolamine Complex (CAS No. 82027-59-6)*.....	26.49%
Other Ingredients.....	73.51%
Total.....	100.00%

*Metallic copper equivalent, 8%

KEEP OUT OF REACH OF CHILDREN
CAUTION

See inside booklet for First Aid, Precautionary Statements and Directions for Use.

Lake Restoration, Inc.
12425 Ironwood Circle
Rogers, MN 55374
1-877-428-8898
www.lakerestoration.com

EPA Reg. No. 84868-1
EPA Est. No. 84868-MN-001

8918.1
Disc.



Department of Agriculture
STATE OF HAWAII

Net Contents:

128 ounces (1 Gallon)

32 ounces (1 Quart)

LICENSED

PERIOD **2013-2015** LIC. NO.

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PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

CAUTION: Harmful if swallowed or absorbed through the skin. Avoid breathing vapor or spray mist. Avoid contact with skin, eyes or clothing. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.

STORAGE & DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

Pesticide Storage: Store in a cool, dry place away from children and animals.

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Handling: Non-refillable container. Do not reuse or refill this container. Clean container promptly after emptying.

Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container ¼ full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Offer for recycling, if available or reconditioning, if appropriate.

See Label for Additional Precautions and Directions for Use

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FIRST AID

If Swallowed	<ul style="list-style-type: none">• Immediately call a poison control center or doctor.• Do not induce vomiting unless told to do so by a poison control center or doctor.• Do not give any liquid to the person.• Do not give anything by mouth to an unconscious person.
If on Skin or Clothing	<ul style="list-style-type: none">• Take off contaminated clothing.• Immediately rinse skin with plenty of water for 15-20 minutes.• Call a poison control center or doctor for treatment advice.
If Inhaled	<ul style="list-style-type: none">• Move person to fresh air.• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible.• Call a poison control center or doctor for further treatment advice.
If in Eyes	<ul style="list-style-type: none">• Hold eye open and rinse slowly and gently with water for 15 to 20 minutes.• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.• Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-222-1222 for emergency medical treatment information.

PRECAUTIONARY STATEMENTS
Hazards to Humans and Domestic Animals

CAUTION: Harmful if swallowed or absorbed through the skin. Avoid breathing vapor or spray mist. Avoid contact with skin, eyes or clothing. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.

Personal Protective Equipment (PPE):

Mixers, loaders, applicators and other handlers must wear the following:

- Long-sleeve shirt
- Long pants
- Chemical-resistant gloves made of any waterproof material
- Shoes and socks

User Safety Requirements:

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Discard clothing and other absorbent material that have been drenched or heavily contaminated with this product. Do not reuse them.

User Safety Requirements:

User must wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

User must remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

User must remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Environmental Hazards

This product is toxic to fish and aquatic invertebrates. Waters treated with this product may be hazardous to aquatic organisms. Treatment of aquatic weeds and algae can result in oxygen loss from decomposition of dead algae and weeds. This oxygen loss can cause fish and invertebrate suffocation. To minimize this hazard, do not treat more than $\frac{1}{2}$ of the water body to avoid depletion of oxygen due to decaying vegetation. Wait at least 14 days between treatments. Begin treatment along the shore and proceed outwards in bands to allow fish to move into untreated areas. Consult with the State or local agency with primary responsibility for regulating pesticides before applying to public waters, to determine if a permit is required.

Certain water conditions including low pH (≤ 6.5), low dissolved organic carbon (DOC) levels (3.0 mg/L or lower) and "soft" waters (i.e., alkalinity less than 50 mg/L), increased the potential acute toxicity to non-target aquatic organisms.

Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA. Do not contaminate water when disposing of equipment wash-waters.

Storage & Disposal

Do not contaminate water, food or feed by storage or disposal.

Pesticide Storage: Store in a cool, dry place away from children and animals.

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Handling: Non-refillable container. Do not reuse or refill this container. Clean container promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container $\frac{1}{4}$ full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Offer for recycling, if available or reconditioning, if appropriate.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons either directly or through drift. Do not apply this product in a way that will contact adults, children or pets, either directly or through drift. Only protected handlers are allowed in the area during application. Do not enter or allow others to enter until application of product has been completed. For any requirements specific to your State or Tribe, consult the State or Tribal agency responsible for pesticide regulation.

Mizzen Algaecide is for the application to fresh water lakes, potable water reservoirs, ponds including golf course ponds), fish hatcheries, irrigation canals, laterals, and ditches and other such slow-moving or quiescent bodies of water. Mizzen Algaecide can also be applied to irrigation systems prior to appearance of algae to prevent growth in system components.

Mizzen Algaecide effectively controls diverse algal types including branched, filamentous (mat-forming and planktonic (suspended) forms. For best results, apply Mizzen Algaecide at the first appearance of algae bloom.

SPRAY DRIFT MANAGEMENT

A variety of factors, including weather conditions (e.g., wind direction, wind speed, temperature, relative humidity) and the method of application (e.g., ground, aerial, airblast, chemigation) can influence pesticide drift. The applicator must evaluate all factors and make appropriate adjustments when applying the product.

Droplet Size: Apply only as a medium or coarser spray (ASAE standard 572) or a volume mean diameter of 300 microns or greater for spinning atomizer nozzles.

Wind Speed: Do not apply at wind speeds greater than 15 mph. Only apply this product if the wind direction favors on-target deposition (approximately 3 to 10 mph) and there are no sensitive areas within 250 feet down wind.

Temperature Inversions: If applying at wind speeds less than 3 mph, the applicator must determine if a) conditions of temperature inversion exist, or b) stable atmospheric conditions exist at or below nozzle height. Do not make applications into areas of temperature inversions or stable atmospheric conditions.

Other State and Local Requirements: Applicators must follow all state and local pesticide drift requirements regarding application of copper compounds. Where states have more stringent regulations, they must be observed.

Equipment: All application equipment must be properly maintained and calibrated using appropriate carriers or surrogates.

Additional requirements for aerial applications:

- The boom length must not exceed 75% of the wingspan or 90% of the rotor blade diameter.
- Release spray at the lowest height consistent with efficacy and flight safety. Do not release spray at a height greater than 10 feet above the drop canopy unless a greater height is required for aircraft safety.

- When applications are made with a crosswind, the swath must be displaced downwind. The applicator must compensate for this displacement at the up and downwind edge of the application area by adjusting the path of the aircraft upwind.

Additional requirements for ground boom application:

- Do not apply with a nozzle height greater than 4 feet above the crop canopy.

OTHER TREATMENT FACTORS AND CONSIDERATIONS

Decomposition of dead plant material will result in dissolved oxygen depletion and subsequent fish kill. High water temperatures and dense weed infestation are exacerbating factors. To avoid excessive oxygen depletion and fish kill:

- Apply treatment along the shore and proceed outwards in bands to allow fish to move into untreated areas.
- No more than ½ of the water body may be treated at one time (refer to Environmental Hazards for additional guidance).
- Do not apply more of this product than required for the treatment area.
- The minimum retreatment interval between consecutive treatments is 14 days.

The risk of fish toxicity generally decreases as the hardness of the water increases.

Lakes known to be stratified (summer application) require treatment of the upper 6 feet of water only.

Lakes known to be non-stratified (spring/fall application) require treatments based on the total water depth.

METHODS OF APPLICATION

Surface Applications: Apply using a land-based hand or power sprayer adjusted to low-pressure, coarse droplets (rain-sized) or a boat sprayer to provide uniform coverage. Surface applications are appropriate for shallow depths of 4 feet or less. Use a diluted spray mixture and apply evenly across the surface of the water from a boat or from shore.

Sub-Surface Applications: Apply using a spray system with boom-mounted weighted trailing hoses 18-24 inches long. Hoses with release the spray mixture 3-6 inches below the water surface. Booms can be mounted on the boat's bow or stern. Make applications in swaths no more than 20 feet apart. Sub-surface applications are required for water depths exceeding 4 feet. Weighted trailing hoses must be set to deliver the required rate of Mizzen [this product] to zones containing dense algae populations. Sub-surface application can be used for direct or invert applications. Avoid dragging the hoses on the bottom.

Bottom placement: Using weighted, trailing hoses and water as the carrier, inject the diluted product plus diquat mixture 1 to 2 feet above the bottom of the water body.

Polymer Applications: Spray sinking, deposition and retention can be improved by addition of a polymer to Mizzen Algaecide or to a dilution of this product in water. Follow the algae control requirements and directions for use on the polymer product label.

Invert Emulsions: Mizzen Algaecide may be applied alone or in combination with aquatic herbicide (see below) in an invert emulsion. Inverts are not suited for surface application and must be applied as a sub-surface treatment using weighted hoses. Refer to Sub-Surface Applications above.

ALGAE CONTROL**Copper Levels Required for Control of Algae**

Organism	0.2 - 0.5 ppm Copper		0.5 - 1.0 ppm Copper	
Cyanophyceae (Blue-Green-Algae)	<i>Anabaena</i> <i>Aphanizomenon</i> <i>Cylindrospermum</i> <i>Gloeotrichia</i> <i>Gomphosphaeria</i>	<i>Microcystis</i> <i>Oscillatoria</i> <i>Plectonema</i> <i>Polycystis</i>	<i>Calothrix</i> <i>Nostoc</i>	<i>Phormidium</i> <i>Symploca</i>
Chlorophyceae (Green Algae)	<i>Botryococcus</i> <i>Closterium</i> <i>Coelastrum</i> <i>Draparnaldia</i> <i>Enteromorpha</i> <i>Gloecystis</i>	<i>Hydrodictyon</i> <i>Microspora</i> <i>Spirogyra</i> <i>Tribonema</i> <i>Ulothrix</i> <i>Zygnema</i>	<i>Ankistrodesmus</i> <i>Chara</i> <i>Chlorella</i> <i>Cladophora</i> <i>Crucigenia</i> <i>Desmidium</i> <i>Golenkinia</i>	<i>Nitella</i> <i>Oocystis</i> <i>Palmella</i> <i>Pithophora</i> <i>Scenedesmus</i> <i>Staurastrum</i> <i>Tetraedron</i>
Diatomaceae (Diatoms)	<i>Asterionella</i> <i>Fragilaria</i> <i>Gomphonema</i> <i>Melosira</i> <i>Navicula</i>	<i>Nitzschia</i> <i>Stephanodiscus</i> <i>Synedra</i> <i>Tabellaria</i>	<i>Achnanthes</i> <i>Cymbella</i> <i>Neidium</i>	
Protozoa (Flagellates)	<i>Ceratium</i> <i>Cryptomonas</i> <i>Dinobryon</i> <i>Euglena</i> <i>Glenodinium</i>	<i>Mallomonas</i> <i>Synura</i> <i>Uroglena</i> <i>Volvox</i>	<i>Chlamydomonas</i> <i>Eudorina</i> <i>Hawmatococcus</i>	<i>Pandorina</i> <i>Peridinium</i>

Free-floating algae is controlled at rates equivalent to 0.2 to 0.5 ppm metallic copper. Mat-forming algae is controlled at rates equivalent to 0.5 to 1.0 ppm metallic copper. Hard to control algae, such as *Chara* and *Phormidium* require a rate of 0.5 to 1.0 ppm metallic copper to be applied at the first signs of algal growth. The lower ends of the required ranges must be used in soft water and low growth situations. Higher rates within the required ranges must be used in situations of hard water or high algal growth. Always consult your State Fish and Game Agency or other responsible agency before applying this product to public waters.

For best results, apply Mizzen at the first appearance of algae and when water temperatures are above 60°F. Apply under calm conditions in a manner that uniformly distributes this product throughout the treatment area.

Mizzen can be applied directly, but a 10 to 20 fold dilution with water facilitates uniform application. Large mats of floating algae must be removed prior to treatment and a second application made 2 weeks following initial treatment in areas of dense algae growth.

The following table provides the amount of Mizzen required to achieve a desired copper concentration in quiescent or slow-moving water as a function of water depth. This target concentration must be maintained for a minimum of 3 hours to achieve optimal algae control. In moving water, where flow will result in significant reduction of copper within 3 hours of treatment, application of Mizzen through a metering system is required (See Drip System Application on the next page).

APPLICATION RATES FOR CALM OR SLOW-MOVING WATER

Average Depth of Water of Treatment Site (Feet)	Gallons of Mizzen per Surface Acre to Achieve the Desired Copper Concentration		
	0.2 ppm Cu	0.5 ppm Cu	1.0 ppm Cu
1	0.7	1.7	3.4
2	1.4	3.4	6.8
3	2.0	5.1	10.2
4	2.7	6.8	13.6

Drip System Application (For Use in Irrigation Systems): In irrigation systems, application must be made prior to appearance of algae. Delayed treatment can allow growth of algae mats that can impede the flow and delivery of water through obstruction of system components. It may be necessary to increase water flow rates during treatment to achieve good chemical distribution for effective algae control.

Application rates are calculated based on water flow rate in cubic feet per second. Prior to application of Mizzen, determine the system flow rate using devices which give accurate water flow measurements (e.g., weirs or orifices). Lacking these devices, the rate of flow can be estimated by the following formula:

Average Width (feet) x Average Depth (feet) x Average Velocity (feet/second) x 0.9 = Cubic Feet per Second (C.F.S.)

Velocity can be estimated by measuring the time it takes a floating object to travel a predetermined distance down the middle of the canal. Velocity (feet/second) is then the distance traveled (feet) divided by the time (seconds) required. The average velocity is the arithmetic mean of the results obtained from a minimum of three individual velocity measurements. Use this average velocity (feet/second) in the formula above to determine the flow rate (C.F.S.).

Once the flow rate is known, the appropriate Mizzen drip rate is as follows:

APPLICATION RATES FOR MOVING WATER

Water Flow Rate		Mizzen Drip Rate (to give 1.0 ppm Cu)		
C.F.S	Gal./Min.	Qts./Hr.	mL/Min.	Fl. Oz./Min.
1	500	1.25	20	0.7
2	1000	2.50	40	1.3
3	1500	3.75	60	2.0
4	2000	5.00	80	2.3
5	2500	6.25	100	3.3

The rates shown above will produce a concentration of 1.0 ppm Cu in treated water. The target copper concentration is obtained by multiplying the rate value read from the table by the target concentration in ppm. As it is necessary to maintain the target application rate for a minimum of 3 hours, the minimum amount of Mizzen needed to achieve effective control is calculated by multiplying the adjusted Qts./Hr. rate by 3, the adjusted mL/ Min. rate by 180 (or adjusted Fl. Oz./Min. rate by 180). Apply Mizzen in the channel at weirs or other turbulence creating

structures or at several injection points across the flow to ensure thorough mixing and uniform dispersion.

Calibrating For Drip Application (Gravity Feed): Add the amount of Mizzen required for 3 hours treatment (as calculated above) to a drum or tank equipped with an adjustable constant flow valve. Adjust the flow rate to the target value by dripping Mizzen into a clean graduated container while measuring the time required to reach a given volume. Several iterations may be necessary to achieve the target flow. Mizzen captured during the valve calibration can be returned to the tank. NOTE: It may be necessary to readjust the constant flow valve if the drip rate changes during the 3-hour treatment period. If electricity is available, a small adjustable metering pump can be used as a more accurate means of introducing Mizzen into the water.

The severity of algae infestation will dictate the distance that algae control will extend from the application point. Any subsequent applications must be made at points 3 hours downstream from the prior point of application. The step can be repeated as necessary until the entire infested area has been treated. Season-long control can require periodic retreatment.

HYDRILLA VERTICILLATA CONTROL

Unless prohibited by the mix partner label, Mizzen can be tank-mixed with aquatic herbicide products containing diquat. In these mixtures, Mizzen kills algae covering Hydrilla and thereby interfering with herbicide absorption. If a product is tank-mixed with Mizzen, the more stringent requirements of the labels must be met. The following table provides example directions for tank mixes with diquat products. The complete effect of these treatments will take 8 to 12 weeks to develop. In case of dense weed growth, a second application may be necessary after 12 weeks.

Example Tank Mixes of Mizzen

Mix Partner	Amount of Mix Partner	Amount of Mizzen	Amount of Water	Additive	Rate	Application Method
Diquat (35.3%) ^{1,2}	1-2 gal. ³	1.7 - 3.4 gal. ⁴	100 gal.	Invert emulsion carrier ⁵	Per A-foot	Surface spray of sub-surface injection or bottom placement ⁶
Current (8% Cu)	3.34 gal.	1.7 - 3.4 gal. ⁵	10-20 gal.		Per A-foot	Surface spray or sub-surface injection ⁷

- 1 Make applications in bright sunlight when water is above 60 ° F.
- 2 In heavily infested areas, a second application after 12 weeks may be necessary.
- 3 See the diquat product label for actual diquat application rate.
- 4 Use the low rate of Mizzen for light infestations of easy-to-control algae in soft water. The high rate of Mizzen is indicated when any of the following conditions exist: heavy algae infestations, difficult-to-control species or hard water.
- 5 An invert emulsion carrier is indicated in slow-moving or muddy water.
- 6 Bottom placement is required where Hydrilla growth has reached the surface.
- 7 Choose an application method which provides uniform coverage of the treated area and delivers the spray solution of the plant surface.

IMPORTANT: READ BEFORE USE

To the extent consistent with applicable law, seller makes no warranty, express or implied, concerning the use of this product other than indicated on the label. Buyer assumes all risk of use and/or handling of this material when such use or handling is contrary to label instructions.

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