

Algistatic Effectiveness

The broad spectrum antimicrobial activity of Microbicide 886 has been further demonstrated in biostatic tests against a number of algae species. The data in Table II indicate the biostatic efficiency of the compound as determined by the Fitzgerald test method.

TABLE II

ALGISTATIC CONCENTRATIONS OF
MICROBICIDE 886(1)

Algae Test Organism	Product Concentration (ppm)
<u>Chlorophyta (Green Algae)</u>	
<u>Ankistrodesmus flaccatus</u>	1.5
<u>Chlamydomonas eugametes</u>	0.8
<u>Chlorella pyrenoidosa(2)</u>	0.4
<u>Coccomyxa elongata</u>	3.0
<u>Cosmarium sp.</u>	0.4
<u>Eudorina elegans</u>	0.2
<u>Mougeotia sp.(2)</u>	0.2
<u>Pandorina murum</u>	0.4
<u>Pediastrum tetras</u>	0.4
<u>Scenedesmus obliquus</u>	1.5
<u>Spirogyra varians</u>	0.8
<u>Ulothrix subtilissima(2)</u>	0.2
<u>Cyanophyta (Blue-green Algae)</u>	
<u>Anabaena cylindrica(2)</u>	0.2
<u>Nostoc sp.</u>	0.2
<u>Oscillatoria prolifera(2)</u>	1.5
<u>Phormidium sp.</u>	0.4
<u>Phormidium retzii</u>	0.4
<u>Chrysophyta (diatoms)</u>	
<u>Navicula pelliculosa</u>	0.2
<u>Nitzschia sp.(2)</u>	0.2

(1) Modified Fitzgerald Test, two-fold serial dilutions with proper growth media. Minimum inhibitory concentrations determined visually after 10-30 days incubation at 21-23°C (depending on growth requirements) and with 16 hours of fluorescent illumination per day.

(2) Test modified by using shake flasks to promote growth.

DIRECTIONS FOR USE

INITIAL TREATMENT

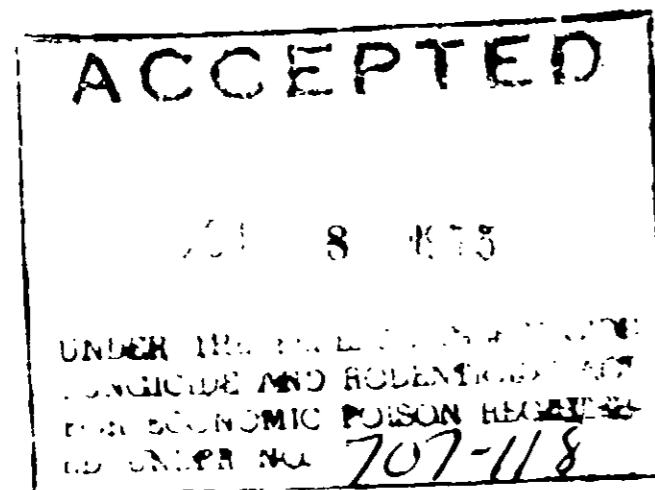
For control of algal, bacterial, and fungal slime in industrial recirculating water cooling towers. Microbicide 886 CT should be added at a dosage of 0.08 pounds (1 $\frac{1}{3}$ ounces av.) to 0.25 pounds (3 $\frac{2}{3}$ ounces av.) per 1000 gallons of water in the system. This dosage should be repeated 2 to 3 times per week until fouling has been reduced to an acceptable level thus establishing microbial control. See Technical Bulletin furnished by the manufacturer for further information.

MAINTENANCE TREATMENT

After microbial control has been established, use the following treatment: if all of the water in the system is lost by blow down every 4-7 days, add 0.04 pounds (2/3 ounces av.) to 0.06 pounds (1 ounce av.) of Microbicide 886 CT per 1000 gallons of water in the system once a week or as needed to maintain control. If all of the water in the system is lost by blow down more rapidly (e.g., every 1-3 days) dose the system 2 or 3 times a week or as needed to maintain control. Badly fouled systems should be cleaned before this treatment is begun.

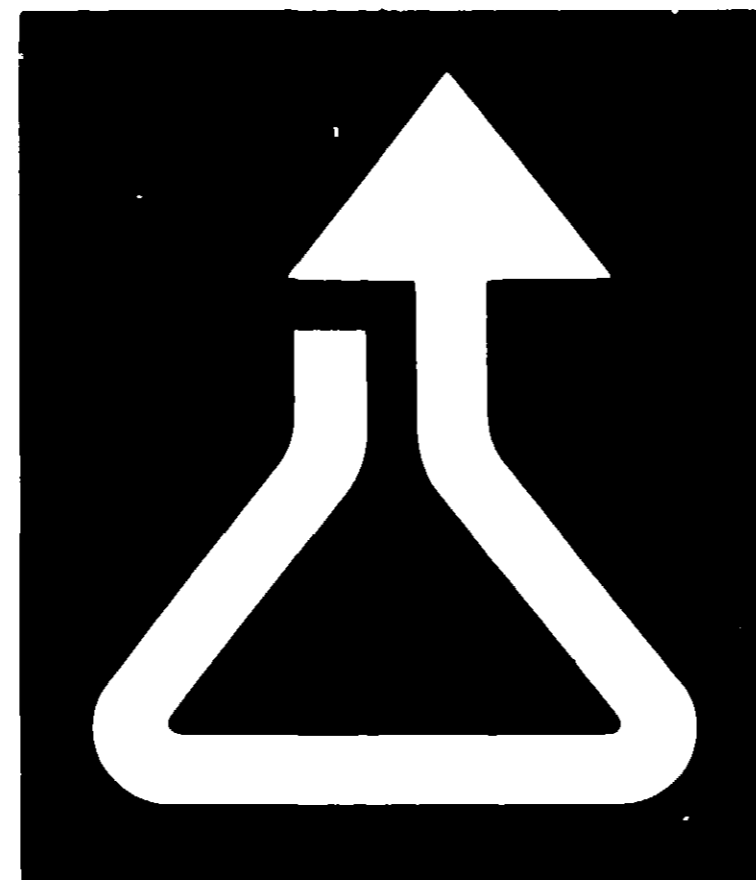
POINT OF ADDITION

Microbicide 886 CT should be added to the basin, to the distribution boxes, or at any other point where it will be rapidly and uniformly dispersed.



MICROBICIDE 886 CT

INDUSTRIAL RECIRCULATING WATER COOLING TOWER MICROBICIDE



**ROHM
AND
HAAS**
PHILADELPHIA, PA. 19105

DANGER!
KEEP OUT OF REACH OF CHILDREN



SEE FIRST AID STATEMENT AND OTHER
PRECAUTIONS ON SIDE PANEL.

ACTIVE INGREDIENTS

5-chloro 2-methyl 4-isothiazolin-3-one calcium chloride	55.0%
2-methyl 4-isothiazolin-3-one calcium chloride	15.0%

INERT INGREDIENTS

Total	30.0%
	100.0%

EPA Reg. No. 707-118
EPA Est. No. 707-PA-1

NET CONTENTS

LBS.

MICROBICIDE 886 CT

INDUSTRIAL RECIRCULATING
WATER COOLING TOWER MICROBICIDE

This product is toxic to fish and wildlife. Treated effluent should not be discharged where it will drain into lakes, streams, ponds or public water. Do not contaminate water by cleaning of equipment or disposal of wastes. Apply this product only as specified on this label.

DANGER!

CORROSIVE
CAUSES EYE DAMAGE AND SKIN BURNS
MAY CAUSE ALLERGIC SKIN REACTION
HARMFUL IF INHALED
HARMFUL OR FATAL IF SWALLOWED OR
BROUGHT IN CONTACT WITH SKIN

Do not get in eyes, on skin, on clothing. Wear goggles or face shield and rubber gloves when handling. Avoid breathing vapor or dust. Avoid contamination of food. Do not take internally. Wash thoroughly after handling.

FIRST AID

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before re-use.

If swallowed, drink promptly a large quantity of milk, egg whites, gelatin solution or if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

NOTE TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed.

NOTICE: Seller warrants that the product conforms to its chemical description and is reasonably fit for the purpose stated on the label when used in accordance with directions under normal conditions of use, but neither this warranty nor any other warranty of merchantability or fitness for a particular purpose, express or implied, extends to the use, storage or handling of this product contrary to label instructions or under abnormal conditions or under conditions not reasonably foreseeable to seller, and buyer assumes the risk of any such use.

DANGER!
KEEP OUT OF REACH OF CHILDREN



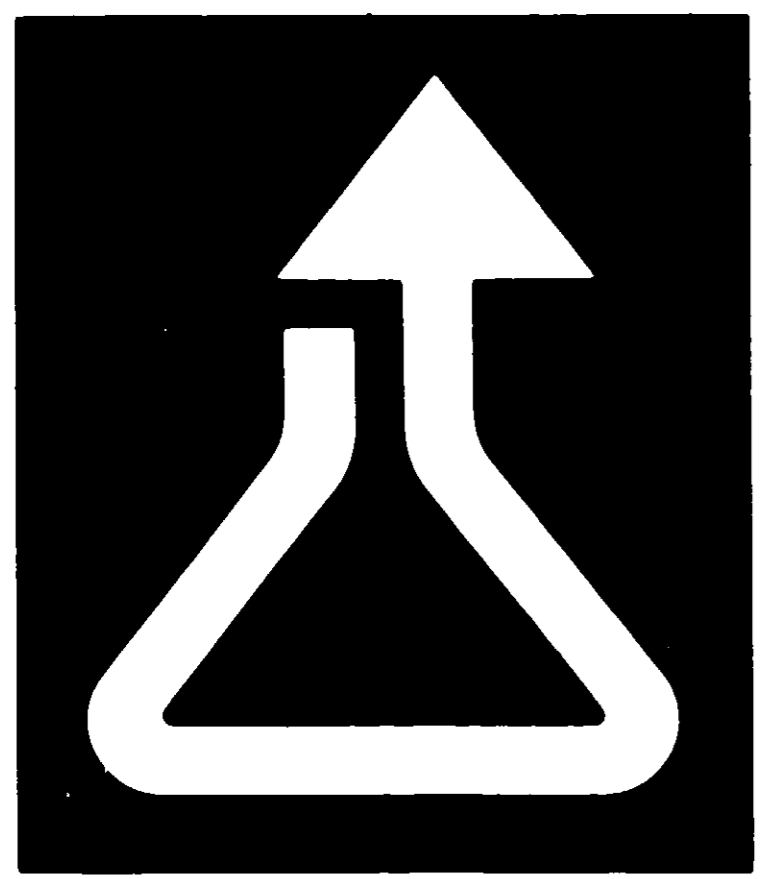
SEE FIRST AID STATEMENT AND OTHER
PRECAUTIONS ON SIDE PANEL.

ACTIVE INGREDIENTS	
5-chloro 2-methyl 4-isothiazolin 3-one calcium chloride	55.0%
2-methyl 4-isothiazolin 3-one calcium chloride	15.0%
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solutions, and most organic and inorganic compounds normally used in chemical specialty products. The compound is inhibited by primary and secondary amines, mercaptans, and sulfides through a chemical reaction mechanism.

Stability - Darkens at 180°C. Decomposes above 250°C.

pH (50% aqueous) - 3.5 to 5.0

Microbicide 886 CT, as supplied, is stable for at least one year.

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These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use of our products are beyond our control. We recommend that the prospective user determine the suitability of our materials and suggestions before adopting them on a commercial scale.

Suggestions for uses of our products or the inclusion of descriptive material from patents and the citation of specific patents in this publication should not be understood as recommending the use of our products in violation of any patent or as permission or license to use any patent of the Rohm and Haas Company.

FORM 2990

Cameraman's Note

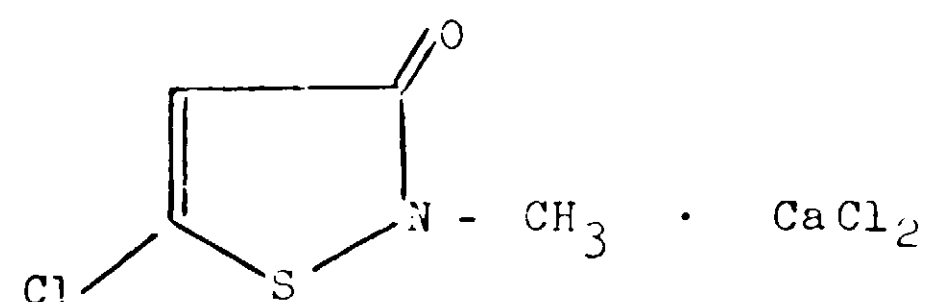
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Chemical Identification:

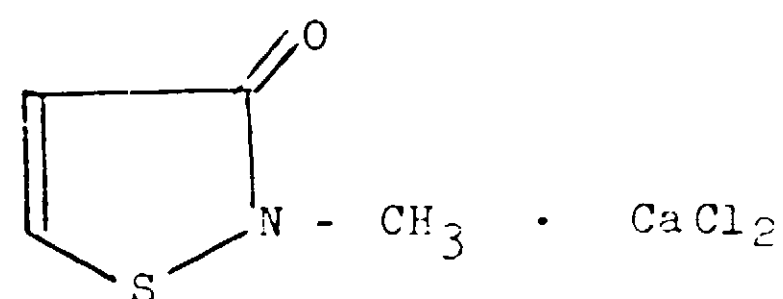
The active ingredients in Microbicide 886 CT are the compounds identified according to Chemical Abstract Nomenclature as 5-Chloro-2-methyl-4-isothiazolin-3-one calcium chloride and 2-methyl-4-isothiazolin-3-one calcium chloride.

Structural Formula:

5-Chloro-2-methyl-4-isothiazolin-3-one calcium chloride:



2-methyl-4-isothiazolin-3-one calcium chloride:



Chemical Composition:

The composition of Microbicide 886 CT as supplied is:

5-Chloro-2-methyl-4-isothiazolin-3-one calcium chloride75.0%
2-methyl-4-isothiazolin-3-one calcium chloride15.0%
Inert Ingredients10.0%

Note: All of the following toxicological and microbial data are based on Microbicide 886 CT as supplied.

TOXICITY

The toxicity and sensitizing characteristics of Microbicide 886 CT are as follows:

1) Acute Oral LD₅₀ of Microbicide 886 CT administered as a 1.0% solution in water to rats.

Males - 105 mg/kg
Females - 112 mg/kg

2) Acute dermal LD₅₀ of a 10% W/V solution of Microbicide 886 CT applied as a 24-hour occluded patch to rabbits:

Intact skin - 200 mg/kg
Abraded skin - 100 mg/kg

- 3) Acute dermal LD₅₀ of a 0.1% W/V solution of Microbicide 886 CT applied as a 24 hour occluded patch to rabbits:

Intact skin - 800 mg/kg

- 4) Acute inhalation LD₅₀ of Microbicide 886 CT applied to rats as an aqueous aerosol is 1.2 mg/liter.
- 5) Primary skin irritation on rabbits from a 24 hour, occluded patch test.

Concentrations (W/V) of Microbicide 886 CT in Water	Irritation Index
1.0%	6.3 (severe)
0.5%	3.16 (moderate)
0.1%	0 (None)

At levels of 0.5% and greater Microbicide 886 CT is considered a primary skin irritant.

- 6) Primary Eye Irritation in Rabbits. Treated eyes washed 2 seconds after instillation of 100 mg of solution - Draize Test.

Concentrations (W/V) of Microbicide 886 CT in Water	Response
10%	Severe corneal, iridial and conjunctival effects
0.5%	Slight irritation
0.1%	No effect

- 7) Fish Toxicity - Dynamic Test on Platyfish

LC₅₀ (6 days) = 0.96 mg/L

- 8) Human Patch Test

Tests were conducted with formulations containing three levels of Microbicide 886 CT, 50 ppm, 100 ppm and 1000 ppm. The formulations were applied respectively to one side of the subjects arms every other day until completion of the studies. The sites were covered with plastic strips (water barrier) and allowed to remain for 24 hours. The sites were rated for irritation on a scale of 0 (no irritation) - 4 (severe irritation) after each 24 hour exposure.

The results show that, at the 100 ppm and 1000 ppm levels, repeated 24 hour exposure of Microbicide 886 CT were required to produce a response. The most rapid reaction was a 4 rating (0-4 scale) after 3 applications. Six of the remaining 7 subjects exhibited a reaction after 24 hour exposure.

All the subjects were rechallenged with the formulation containing Microbicide 886 CT 8 days later. At a concentration of 100 ppm, Microbicide 886 CT causes essentially the same reaction as before. These results indicated that Microbicide 886 CT is a sensitizer at a concentration of 100 ppm in 2 of 10 subjects.

At the 50 ppm level repeated 24 hour exposures of Microbicide 886 CT produced some irritation in 9 out of 10 individuals. In none of these subjects was the irritation of a sensitizing phenomena.

HANDLING PRECAUTIONS

The following handling precautions are included on the Microbicide 886 CT label:

DANGER!

KEEP OUT OF REACH OF CHILDREN
CORROSIVE



Causes severe eye damage and skin burns.
May cause allergic skin reaction.
Harmful if inhaled.
Harmful or fatal if swallowed or brought in contact with skin.

Do not get in eyes, on skin, on clothing. Wear goggles or face shield and rubber gloves when handling. Avoid breathing vapor or dust. Avoid contamination of food. Do not take internally. Wash thoroughly after handling.

FIRST AID

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before reuse.

If swallowed, drink promptly a large quantity of milk, egg whites, gelatin solution or if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

NOTE TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed.

This product is toxic to fish and wildlife. Treated effluents should not be discharged where it will drain into lakes, streams, rivers or public water. Do not contaminate water by cleaning, or disposing of disposal of wastes. Apply this product only as specified on label.

DISSIPATION OF MICROBICIDE 886 CT

Radioassay studies were conducted to follow the dissipation of Microbicide 886 CT in natural river water, soil and in activated sludge. Results of these studies are given below.

Dissipation in One Type of River Water

Percent 5-Chloro-2-methyl-4-isothiazolin-3-one calcium chloride Remaining

Percent 2-methyl-4-isothiazolin-3-one calcium chloride Remaining

Concentration Tested

Concentration Tested

Days	0.01 ppm	0.1 ppm	1.0 ppm	1.0 ppm
1	15%	87%	96%	96%
2	0%	67%	92%	98%
4	-	24%	83%	52%
7	-	0%	72%	28%
14	-	-	61%	0%
35	-	-	25%	-

Dissipation in Activated Sludge Unit

The level of Microbicide 886 CT in the standard soap and detergent activated sludge unit was increased gradually to 10 ppm. The recovery of the charged C14 activity during the seven week test is given below.

Percent of Total C14 Added

	C14-5-Chloro-2-methyl-4-isothiazolin-3-one calcium chloride	C14-2-methyl-4-isothiazolin-3-one calcium chloride
Effluent	55.1%	59.6%
Carbon Dioxide	23.0%	18.3%
Sludge	<u>22.5%</u>	<u>19.3%</u>
TOTAL	101.2%	97.2%

The effluent contained no detectable amount of either parent compound according to GLC analysis.

Dissipation in One Type of Soil

In biometry flask studies, 25% of the C14 activity applied as 1 ppm of C14 5-Chloro-2-methyl-4-isothiazolin-3-one calcium chloride was evolved as C14O2 in 25 days from non-sterile Hagerstown silt loam. There was negligible evolution from sterilized soil.