

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460United States
Environmental Protection
AgencyOffice of Pesticide Programs

October 2, 2006

Steven Goodspeed
Bio-Cide International, Inc.
2845 Broce Drive
Norman, OK 73072

Subject: Oxine
EPA Registration No. 9804-1
Application Date: February 14, 2006
Receipt Date: February 21, 2006

Dear Mr. Goodspeed:

The following amendment submitted in connection with registration under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), as amended, is acceptable with conditions.

Conditions

1. The proposed label claims that this product is an effective disinfectant for a contact time of 10 minutes at a 500 ppm use dilution. These claims are acceptable** as they are supported by the data provided.

**The following changes need to be made to the proposed label:

- (a) **Please Note:** The Agency only accepts claims against Avian Influenza in poultry premise environments. The proposed label has not listed the organisms against which the product is effective on the label. However it must be indicated that the product is only for use against Avian Influenza on the following sites as listed on the proposed label:
 - Disinfecting walls ceilings and floors of poultry processing plants (page4)
 - A poultry house disinfectant (page 13)
- (b) The label must be revised so that specific organism claims and use sites/patterns are clearly linked.

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2. The proposed label claims the product, Oxine is an effective egg shell sanitizer for clean eggs intended for food or food products at a working solution of 100-200 ppm available chlorine dioxide, equal to or warmer than the temperature of the eggs. These claims are acceptable. The applicant must list the contact time for the solution to properly sanitize the eggs.
3. The applicant needs to make the following changes to the proposed label:
 - **Page 4** of the proposed label lists directions for use of the product as a terminal sanitizing rinse for hard non-porous food contact surfaces. These instructions do not list a contact time for the product to be an effective sanitizer. Per DIS/TSS-1 the directions for use must include the contact times necessary for effectiveness. This must be indicated on the product label.
 - **Page 4** of the proposed label, the first item in the right column reads, ". . .surface with active solution making sure surface area is thoroughly wet for at least one (1) minute." This statement must be moved in the middle of the last two items in the left column.

General Comments

A stamped copy of the labeling accepted with conditions is enclosed. Submit one copy of your final printed labeling before distributing or selling the product bearing the revised labeling.

Should you have any questions or comments concerning this letter, please contact Wanda Henson at (703) 308-6345.

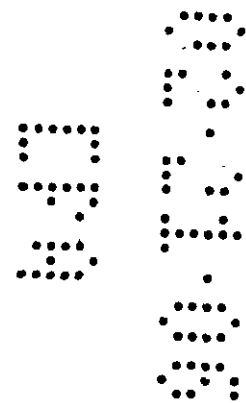
Sincerely,

Emily H. Mitchell
Product Manager - Team 32
Regulatory Management Branch II
Antimicrobials Division (7510P)

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ACCEPTED
with COMMENTS
EPA Letter Dated:

OXINE®



OCT - 2 2006

SANITIZER

Under the Federal Insecticide, Fungicide, and Rodenticide Act as amended, for the pesticide, registered under EPA Reg. No. 9804-1 BACTERIOSTAT/DEODORIZER -ACTIVE OXINE®.

STERILANT-DISINFECTANT

FUNGICIDAL-BACTERICIDAL-VIRUCIDAL-TUBERCULOCIDAL-SPORICIDAL

- | | |
|-----------------------------|------------------------|
| Food Processing Plants | *Guaranteed Shelf Life |
| Bottling Plants | *Non-Volatile |
| Institutional Use | *Non-Flammable |
| Animal Confinement | *Low Corrosion |
| Medical/Dental Laboratories | *Odor Control |

This product can be used in Federally Inspected Meat and Poultry Facilities

KEEP OUT OF REACH OF CHILDREN
CAUTION

PRECAUTIONARY STATEMENT: HAZARD TO
HUMANS AND DOMESTIC ANIMALS

HARMFUL IF SWALLOWED MAY CAUSE IRRITATION
AVOID CONTACT WITH EYES

Active Ingredient:

Chlorine Dioxide.....	2.0%
Other Ingredients.....	98.0%
Total.....	100.0%

STORE IN COOL DARK PLACE-KEEP FROM FREEZING
E.P.A. REG. NO. 9804-1 E.P.A.EST. NO. 9804-OK-1

Net Contents: 16 oz. 32 oz. 128 oz.
 5 gallons 30 gallons 55 gallons

Bio-Cide International, Inc
P.O. Box 722170
Norman, OK 73070-8644

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PROPER ACTIVATION OF OXINE®

MEASURE out the desired volume of Oxine® concentrate into a clean vessel in a well ventilated area. ADD the required amount of activator acid, stir and allow to dissolve for five minutes for citric acid or two minutes for phosphoric acid. Avoid breathing any fumes that may be produced. After appropriate activation time, DILUTE with clean water to your desired final concentration.

<u>CONCENTRATION</u>		<u>OUNCES PER 5 GALLONS</u>		<u>CITRIC ACID</u> <u>ACTIVATOR</u>
5	ppm	0.16	fl. oz./5 gallon	0.5g
10	ppm	0.32	fl. oz./5 gallon	1.0g
20	ppm	0.64	fl. oz./5gallon	2.0g
40	ppm	1.28	fl. oz./5gallon	4.0g
50	ppm	1.60	fl. oz./5gallon	5.0g
100	ppm	3.20	fl. oz./5gallon	10.0g
200	ppm	6.40	fl. oz./5gallon	20.0g
500	ppm	16.00	fl. oz./5gallon	50.0g

<u>CONCENTRATION</u>		<u>OUNCES PER 5 GALLONS</u>		<u>33% PHOSPHORIC</u> <u>ACID LIQUID</u>
5	ppm	0.16	fl. oz./5 gallon	0.025 fl.oz.
50	ppm	1.60	fl. oz./5gallon	0.25 fl.oz.
100	ppm	3.20	fl. oz./5gallon	0.5 fl.oz.
500	ppm	16.00	fl. oz./5gallon	2.5 fl.oz.

PROPER DILUTION OF OXINE®

Parts Per
Million

5	ppm	0.032 fl. oz.	per gallon	or	0.25 ml per liter
10	ppm	0.064 fl. oz.	per gallon	or	0.5 ml. per liter
20	ppm	0.128 fl. oz.	per gallon	or	1.0 ml. per liter
40	ppm	0.256 fl. oz.	per gallon	or	2.0 ml. per liter
50	ppm	0.32 fl. oz.	per gallon	or	2.5 ml per liter
80	ppm	0.512 fl. oz.	per gallon	or	4.0 ml per liter
100	ppm	0.64 fl. oz.	per gallon	or	5.0 ml. per liter
200	ppm	1.28 fl. oz.	per gallon	or	10.0 ml per liter
400	ppm	2.56 fl. oz.	per gallon	or	20.0 ml. per liter
500	ppm	3.2 fl. oz.	per gallon	or	25.0 ml. per liter
1,000	ppm	6.4 fl. oz.	per gallon	or	50.0 ml. per liter
2,500	ppm	16.0 fl. oz.	per gallon	or	125.0 ml. per liter

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Parts Per
Million

5	ppm	0.16 fl. oz.	per Five (5) gallons	or	1.25	ml per liter
50	ppm	1.6 fl. oz.	per Five (5) gallons	or	12.5	ml per liter
100	ppm	3.2 fl. oz.	per Five (5) gallons	or	25.0	ml. per liter
500	ppm	16 fl. oz.	per Five (5) gallons	or	125.0	ml. per liter

Alternative Activation

The active biocidal component of Oxine[®] system is free chlorine dioxide. Unactivated Oxine[®] in the neutral to mildly alkaline pH range is bacteriostatic. For higher level microbial control, such as disinfection and sanitation, activation of Oxine[®] is required to generate free chlorine dioxide. The use of citric acid as an activator is specified in most Oxine[®] label applications. Alternatives to citric acid for activation include organic acids, such as acetic acid, and inorganic acids such as phosphoric, hydrochloric, and sulfuric acids. Activation equivalent to that of citric acid may be achieved by adjusting the Oxine[®] solution to pH 2-3 with an alternative acid. The activated Oxine[®] is then diluted to the required use concentration in accordance with label instructions. For food processing applications only food grade activator acids may be used. Bio-Cide International, Inc or your Oxine[®] distributor can guide you in proper activation techniques.

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IN FOOD PROCESSING PLANTS SUCH AS POULTRY, FISH & MEAT, RESTAURANTS, DAIRIES, BOTTLING PLANTS AND BREWERIES

1) As a terminal sanitizing rinse for stainless steel and other hard nonporous food contact surfaces such as tanks, transfer lines, recirculation and clean in place (CIP) systems and other food processing equipment in accordance with 21 CFR 178.1010.

Direction for Use:

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

i) All gross food particles and soil should be removed prior to sanitizing by use of a pre-flush, pre-scrape or pre-soak treatment.

ii) Clean tank, line, or surface thoroughly using a suitable detergent and rinse with clean potable water before sanitizing.

iii) Preparation of sanitizing solutions: Prepare an activated working solution containing 100 ppm available chlorine dioxide according to the activation chart.

iv) To apply: Fill, flush, immerse, circulate or spray tank, line, equipment or food contact

After sanitizing drain tank, line or equipment, allow to air-dry. Fresh sanitizing solution should be made up daily.

surface with active solution making sure surface area is thoroughly wet for at least one minute.

2) To disinfect walls, ceilings and floors.

Directions for Use:

i) Before disinfection, all gross filth must be removed from areas to be disinfected and thoroughly cleaned with a suitable detergent followed by a clean, potable water rinse.

ii) Preparation of disinfecting solution: Prepare an activated working solution containing 500 ppm available chlorine dioxide according to the activation chart.

iii) To apply: Spray disinfectant solution onto surface to be disinfected, using a suitable spraying device and making sure that the area is thoroughly wet for at least ten (10) minutes. Active solutions may be irritating when breathed, therefore, always use an applicable NIOSH/MSHA approved respirator appropriate for chlorine dioxide when spraying these solutions. After application allow to air dry. Treat as required. Never reuse activated solutions.

3) To control the buildup of odor and slime forming bacteria in process waters for vegetable and fruit rinses and associated tanks, flumes and lines.

4) For use in the preparation of fruits and vegetables to extend freshness and shelf life.

Directions for Use:

Directions for Use:

i) All tanks, flumes and lines etc., should be thoroughly cleaned when possible with a suitable detergent and completely rinsed using clean, potable water prior to treatment

i) Before treatment, whole fruits and vegetables should be washed and thoroughly rinsed with clean potable water.

ii) Preparation of solution: Chill tanks or vegetable rinse tanks may be batch loaded at start up. Prepare a non-activated working solution containing 5 ppm available chlorine dioxide according to the dilution chart. Make up waters should be treated using a chemical feed pump. In order to insure accurate delivery, a 1 to 10 dilution of the active concentration should be made and the feed rate of 3 and 1/3 fl. oz. per ten (10) gallons should be maintained. Make up fresh solutions daily.

ii) Preparations of stock solutions: Activate Oxine® rinse pack by grasping pack and squeezing firmly to break middle seal. Manipulate pack to mix contents. After five (5) minutes, tear open pack and pour contents into the 1/2 gallon dispenser supplied. Avoid breathing any fumes which may be present. Fill to neck with tap water.

iii) Optional activated solution – if heavy use of rinse water is expected or if slime buildup is extreme, an additional activation step may be used in preparation of solution.

iii) Preparation of treatment solution: Use five (5) depressions (5 fl. oz.) of the half gallon dispenser solution per gallon of treatment water. This gives a working solution of five (5) ppm.

PRE-TREATMENT FOR UNCUT, UNPEELED FRUITS AND VEGETABLES.

iv) Preparation of activated solution: Prepare an activated working solution containing 5 ppm available chlorine dioxide according to the activation chart. Chill tanks or vegetable rinse tanks may be batch loaded at start up with activated Oxine® solution at 1/3 fl. oz. per ten (10) gallons of potable water. Makeup waters should be treated using a chemical feed pump. In order to insure accurate delivery, a 1 to 10 dilution of the active concentrations should be made and the feed rate of 3 and 1/3 fl. oz. per ten (10) gallons should be maintained. Make up fresh solutions daily.

iv) Alternative preparation: Prepare a non-activated working solution containing 5 ppm available chlorine dioxide according to the dilution chart.

(v) After treatment of fruits and vegetable follow with a potable water rinse. NOTE: Chemical feed pumps and injectors must be chlorine resistant for best operation. Available ClO₂ levels should be confirmed using a Bio-Cide test kit, available from your local Oxine® distributor.

v) Dip product in treatment solution for about (10) to twenty (20) seconds, then follow with a potable water rinse.

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5) To control the buildup of odor and slime forming bacteria in ice making plants and machinery.

Directions for Use:

i) Ice making machinery should be disassembled and thoroughly cleaned using a suitable detergent followed by a potable water rinse.

ii) Preparation and applications of solutions: The Oxine solution should be applied to the incoming water line of the ice machine via a chemical feed pump or injector system. Prepare a non-activated working solution containing 20 ppm available chlorine dioxide according to the dilution chart.

NOTE: Chemical feed pumps and injectors must be chlorine resistant for best operation. Available ClO_2 levels should be confirmed using a test kit available from Bio-Cide International, Inc.

6) As a bacteriostat to treat ice used for icing fish in the round.

Directions for Use:

i) Oxine[®] may be batch loaded or metered into makeup water used to produce ice for icing fish in the round. Prepare a non-activated working solution containing 20 ppm available chlorine dioxide according to the dilution chart.

7) To control odor and slime forming bacteria build-up in commercial water filtration systems, sand beds, gravel beds and charcoal filters, with accessible service hatches.

Directions for Use:

i) Drain all existing water from sand and carbon filters and rinse once with clean, potable water. Fill sand filter with potable water and adjust pH of water to 6.0 using citric acid or equivalent pH adjuster.

ii) To prepare solution: Measure out two (2) fl. oz. Oxine concentrate for each gallon of filter system volume (300 ppm available ClO_2) and add to the sand filter through access hatch. Fill system with clean, potable water and circulate system 30 minutes. Allow system to soak two (2) to three (3) hours. After treatment, drain system and rinse with clean, potable water until residue is no longer detectable using the Bio-Cide test kit and when pH is normal.

8) To control mold and mildew, odor and slime forming bacteria on walls, floors, and ceilings.

Directions for Use:

i) Before treatment, all soil and gross filth must be removed from areas to be treated and cleaned with detergent followed by a potable water rinse.

ii) Preparation of solution: Prepare a non-activated working solution containing 1,000 ppm available chlorine dioxide according to the dilution chart.

iii) To apply: spray solutions onto walls, floors, and ceilings using a suitable spraying device making sure all surface areas are damp. Avoid breathing solutions mist by using an applicable NIOSH/MSHA approved respirator appropriate for chlorine dioxide. Avoid contact with food or food contact surfaces. Allow to air dry.

iv) Repeat application as needed.

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9) To control the build-up of odor and slime forming bacteria in stainless steel transfer lines and on-line equipment such as hydrocoolers, pasteurizers and the like overnight and over weekends.

Directions for Use:

i) Clean equipment or line thoroughly using a suitable detergent followed by a clean, potable water rinse before treatment.

ii) Preparation and application of solution: Prepare a non-activated working solution containing 20 ppm available chlorine dioxide according to the dilution chart. Mix and fill lines and equipment overnight. Drain and allow to air dry just prior to next run start-up.

10) For microbial control in sweetwater cooling systems:

Directions for Use:

i) Oxine® may be batch loaded or metered into sweetwater cooling systems. Prepare a non-activated working solution containing 5 ppm available chlorine dioxide according to the dilution chart.

ii) Oxine® concentrations should be monitored using BCI test kits to maintain a 5.0 ppm concentration

11) For use as a lube additive to control bacterial slime and odor on moving conveyors and chains in food processing facilities.

Directions for Use:

i) Prior to the application of the lube Oxine® mixture, all conveyors, lube lines, spray nozzle heads, conveyor surfaces, and other associated structures should be thoroughly cleaned and sanitized.

ii) Oxine® should be added to the water dilution step of the lube system just prior to its injections into the distribution system. Addition of the Oxine into the lube/water mixture should be at the rate of 0.64 fl. oz. to 1.28 fl. oz. per 10 gallons of lube mixture. This will result in a final concentration of between 10 and 20 ppm Oxine® in the lube solution.

iii) For best results use with natural (fatty acid, soap based) lubricant products. For advice on lube compatibilities contact your BCI distributor.

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12) To control odor and slime forming bacteria in cooling and warming waters, such as canning retort and pasteurizer cooling waters, used to decrease or increase packaged product temperature by immersion in or by spraying with the treated waters.

Directions for Use

i) All tanks, tunnels, conveyor chains, heat exchangers, heat exchange towers, lines, spray bars, and nozzles should be thoroughly cleaned, when possible, and completely rinsed using clean, potable water prior to treatment.

ii) Preparation of solution: Water systems including the cooling or warming tanks or spray systems, towers, lines and all water containing parts of the system may be batch loaded at start up. Prepare a non-activated working solution containing 5 ppm available chlorine dioxide according to the dilution chart. To maintain the 5.0ppm available chlorine dioxide in the water system, a timed or electronically controlled chemical feed pump or injector system can be used for additions to the system or for treating the make-up water. Make up new Oxine® solutions daily.

iii) Preparation of activated solution: Cooling or warming water systems may be batch loaded at start up. Prepare an activated working solution containing 5 ppm available chlorine dioxide according to the activation chart. Batch or timed additions of the prepared solution can be made or a electronically controlled chemical feed pump or injector system can be used for additions of the prepared solution to the process water to maintain 5.0 ppm available chlorine dioxide.

Note: Chemical feed pumps and injectors must be chlorine resistant for best operation. Available chlorine dioxide levels should be confirmed using a BCI test kit, available from your local Oxine® distributor.

13) To sanitize clean shell eggs intended for food or food products.

Directions for Use:

i) Preparation of sanitizing solution: Prepare an activated working solution containing 100-200 ppm available chlorine dioxide according to the activation chart.

ii) Spray eggs thoroughly with activated solution and allow to drain. Solution must be equal to or warmer than the eggs, but not to exceed 130°F.

iii) Eggs that have been sanitized with this chlorine dioxide compound may be broken in the manufacture of egg products without a prior potable water rinse. Eggs must be reasonably dry before casing or breaking. The solution must not be reused for sanitizing eggs.

IN MUSHROOM FACILITIES, SUCH AS MUSHROOM PRODUCTION, SPAWN PRODUCTION, MUSHROOM PROCESSING, AND CANNERY OPERATIONS

1) As a terminal sanitizing rinse for stainless steel tanks, transfer lines, on-line equipment, picking baskets, picking utensils, and other food contact surfaces.

Directions for Use:

i) All gross food particles and soil should be removed prior to sanitizing by use of a pre-flush, pre-scrape or pre-soak treatment.

ii) Clean picking baskets, line equipment or other surface thoroughly using a suitable detergent and rinse with clean potable water before sanitizing.

iii) Preparation of sanitizing solution: Prepare an activated working solution containing 100 ppm available chlorine dioxide according to the activation chart.

iv) To apply: Flush picking baskets, line equipment or other food contact surface with active solution making sure surface area is thoroughly wet for at least one (1) minute. After sanitizing drain baskets or equipment and allow to air dry. Treat after each use or production run. Discard solution after each use.

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2) To disinfect walls, ceilings, and floors.

Directions for Use:

i) Before disinfection, all gross filth must be removed from areas to be disinfected and thoroughly cleaned with a suitable detergent followed by a clean, potable water rinse.

ii) Preparation of active disinfecting solution: Prepare an activated working solution containing 500 ppm available chlorine dioxide according to the activation chart.

iii) To apply: Spray disinfectant solution onto surface using a suitable spraying device and making sure that the area is thoroughly wet for at least ten (10) minutes. Active solutions may be irritating when breathed, therefore, always use an applicable NIOSH/MSHA approved respirator appropriate for chlorine dioxide when spraying these solutions. After application, allow to air dry. Treat as required. Always apply freshly made solutions. Never reuse activated solutions.

3) To control mold and slime forming bacteria on walls, floors, ceilings, and post-crop mushroom growing surfaces.

Directions for Use:

i) Before treatment, all soil and gross filth must be removed from areas to be treated and cleaned with detergent followed by a potable water rinse.

ii) Preparation of solution: Prepare a non-activated working solution containing 1000 ppm available chlorine dioxide according to the dilution chart.

iii) To apply: Drench, spray or fog solution onto walls, floors, ceilings and post-crop mushroom growing surface using a suitable watering, spraying or fogging device and making sure all surface areas are wet. During application, area must be closed as tightly as possible and sealed. After spraying or fogging, the area should be opened and aired for one (1) hour before repopulating. Avoid breathing solution mist by use of an applicable NIOAH/MSHA approved respirator appropriate for chlorine dioxide. Avoid contact with food or food contact surfaces. Allow to air dry.

iv) Repeat application as needed.

IN POTATO FACILITIES SUCH AS PROCESSING/PACKAGING OPERATIONS, STORAGE SHEDS, STORAGE CELLARS, AND SEED PRODUCTION FACILITIES.

i) As a terminal sanitizing rinse for bins, tanks, flume line, on-line equipment, conveyors, seed cutters, and other potato handling equipment.

ii) All gross food particles and soil should be removed prior to sanitizing by use of a pre-flush, pre-scrape or pre-soak treatment.

iii) Clean tank, line, or surface thoroughly using a suitable detergent and rinse with clean potable water before sanitizing.

iv) Preparation of solution: Prepare an activated working solution containing 100 ppm available chlorine dioxide according to the activation chart.

v) To apply: Fill, flush, immerse, or spray tank, line, equipment or food contact surface with active solution making sure surface area is thoroughly wet for at least one minute. After sanitizing drain tank, line or equipment allow to air dry. Fresh sanitizing solution should be made up daily or more often if solution becomes diluted or soiled.

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2) To disinfect walls, ceilings, floors, planting and harvesting equipment, and truck beds.

accurate delivery, a 1 to 10 dilution of the active concentration should be made and the feed rate of 3 and 1/3 fl. oz. per ten (10) gallons should be maintained. Make up fresh Oxine® solutions daily.

Directions for Use

i) Before disinfection, all gross filth must be removed from areas to be disinfected and thoroughly cleaned with a suitable detergent followed by a clean, potable water rinse.

NOTE: Chemical feed pumps and injectors must be chlorine resistant for best operation. Available ClO₂ levels should be confirmed using a Bio-Cide test kit available from your local Oxine® distributor.

ii) Preparation of active disinfecting solution: Prepare an activated working solution containing 500 ppm available chlorine dioxide according to the activation chart.

iv) After treatment, the potatoes must be rinsed with potable water.

iii) To apply: Spray disinfectant solution onto surface to be disinfected using a suitable spraying device and making sure that the area is thoroughly wet for at least ten (10) minutes. Active solutions may be irritating when breathed, therefore, always use an applicable NIOSH/MSHA approved respirator appropriate for chlorine dioxide when spraying these solutions. Never reuse activated solutions.

3) To control the buildup of odor and slime forming bacteria in process waters for potato rinse, associated tanks, flumes and lines.

Directions for Use:

i) All tanks, flumes and lines etc., should be thoroughly cleaned when possible with a suitable detergent and completely rinsed using clean, potable water prior to treatment.

ii) Preparation of solution: Chill tanks or vegetable rinse tanks may be batch loaded at start up. Prepare a non-activated working solution containing 5 ppm available chlorine dioxide according to the dilution chart. Make up waters should be treated using a chemical feed pump or injector system. Make up new Oxine solution daily.

iii) Preparation of activated solution: Prepare an activated working solution containing 5 ppm available chlorine dioxide according to the activation chart. Chill tanks or vegetable rinse tanks may be batch loaded at start up with activated Oxine® solution. Make-up waters should be treated using a chemical feed pump. In order to insure

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IN LABORATORIES, HOSPITALS, MORGUES, INSTITUTIONS

This product is not to be used as a terminal sterilant/high level disinfectant on any surface or instrument that (1) is introduced directly into the human body, either into or in contact with the bloodstream or normally sterile areas of the body, or (2) contacts intact mucous membranes but which does not ordinarily penetrate the blood barrier or otherwise enter normally sterile areas of the body. This product may be used to preclean or decontaminate critical or semi-critical medical devices prior to sterilization or high level disinfection.

1) To disinfect non-porous, hard surfaces such as tile floors, walls and ceilings and stainless steel cold rooms and walk -in incubators.

of Oxine, stored in plastic squirt bottles, may be held up to one (1) week before replacement with fresh solution. Soak solutions of Oxine[®] should be changed daily.

Directions for Use:

i) Clean all surfaces thoroughly with a suitable detergent and rinse with water prior to disinfections.

ii) Preparation of active disinfecting solution: Prepare an activated working solution containing 500 ppm available chlorine dioxide according to the activation chart.

iii) To apply: Activated solutions may be sprayed, mopped or sponged onto surfaces to be disinfected. All surfaces must be thoroughly wetted for at least ten (10) minutes. When spraying disinfectant solutions, use an appropriate spraying device. Active solutions may be irritating when breathed, therefore, always use an applicable NIOSH/MSHA approved respirator appropriate for chlorine dioxide when spraying these solutions. After application, allow to air dry. Treat as required. Always apply freshly made solutions. Never reuse activated solutions.

3) To disinfect heat-sensitive, reusable, non-critical medical equipment and other hard, non-porous environmental surfaces found in hospitals, nursing homes, durable medical equipment suppliers, doctor's offices, schools, gymnasiums, homes and animal clinics. Oxine may also be used to decontaminate small medical devices and instruments prior to sterilization or high level disinfection.

Directions for Use:

i) PRECLEAN: Blood and other body fluids must be thoroughly cleaned from surfaces before application of the disinfectant. Blood and other body fluids should be autoclaved and disposed of according to all applicable federal, state and local regulations for waste disposal.

ii) DILUTION: Add (one)(1) ounce of Oxine (concentrate) to a (one)(1) quart container and fill with water to make a (625ppm)(working)(dilute) solution.

iii) ACTIVATION: Activate (one)(1) quart of Oxine(dilute)(solution) by adding (1) teaspoon of activator and immediately mix until activator is dissolved.

2) To disinfect bench tops, biological hoods, incubators, stainless steel equipment and instruments.

Directions for Use:

i) Clean all surfaces thoroughly with a suitable detergent and rinse with water prior to disinfection.

ii) Preparation of active disinfectant solution: Prepare an activated working solution containing 500 ppm available chlorine dioxide according to the activation chart.

iii) To apply: Activated solutions may be squirted directly onto surfaces from a plastic squeeze bottle or may be used as a soak solution. All contact surfaces must be thoroughly damp for at least ten (10) minutes. Allow to air dry. Activated solutions

iv) DISINFECTION: Immerse equipment completely in Oxine (solution)(disinfecting solution) for a minimum of five(5) minutes at room temperature (approx. 65-80 degrees Fahrenheit). Solution remains effective for twenty-four (24) hours. Remove equipment from the solution, rinse with potable tap water, gently shake equipment to remove residual water and air dry. Discard solution in drain with running water. Oxine (disinfecting)(solution) is effective against bacteria including *Mycobacterium tuberculosis*, fungi and viruses including:

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Poliovirus Type 2, Herpes Simplex Type 1, Coxsackie Virus, Rhinovirus, Cytomegalovirus and Respiratory Syncytial Virus (RSV).

4) To disinfect water bath incubators.

Directions for Use:

i) Prior to disinfection, thoroughly clean the reservoir with a suitable detergent and rinse with clean water.

ii) Preparation of active solution: Prepare an activated working solution containing 50 ppm available chlorine dioxide according to the activation chart.

iii) To apply: Activated solution should be poured into water bath reservoir and allowed to stand one (1) hour at room temperature. Drain reservoir and fill with fresh water.

5) To control odor and slime forming bacteria in water bath incubators.

Directions for Use:

i) When using Oxine® in water bath incubators, always begin with a freshly cleaned and disinfected reservoir.

ii) To apply: Fill water bath with clean, potable water to near capacity. For each gallon of water add 1/3 fl. oz. Oxine (50 ppm available ClO₂). When water becomes cloudy, discard water and repeat procedure.

6) To control odors resulting from the sterilization of spent biologicals in steam autoclaves.

Directions for Use:

i) To reduce autoclave odors of used biologicals, Oxine should be sprayed or poured directly into the stainless steel autoclave buckets.

ii) Preparation of solution: Prepare a non-activated working solution containing 1,000 ppm available chlorine dioxide according to the dilution chart.

iii) To apply: Spray or pour Oxine solution into or onto the autoclave buckets just prior to autoclaving.

7) To deodorize animal holding rooms, sick rooms, morgues and work rooms.

Directions for Use:

i) Rooms to be deodorized should be in a clean condition prior to Oxine® application.

ii) Preparation of solution: Prepare a non-activated working solution containing 1,000 ppm available chlorine dioxide according to the dilution chart.

iii) To apply: Spray solution using a suitable spraying device onto walls, ceilings and floor; lightly dampening all surfaces. Avoid breathing mist of solutions by using an applicable NIOSH/MSHA approved respirator appropriate for chlorine dioxide. Allow to air dry, then ventilate the area. Treat as required.

8) Oxine Sterilant – Oxine is recommended for use as a disinfectant in schools, hospitals, medical, dental, industrial and institutional facilities to control human-health related micro-organisms on hard, non-porous environmental surfaces and for sterilizing non-critical medical devices, laboratory and other non-medical devices and equipment. Contraindicated for use with metal instruments. Oxine is sporicidal when objects or surfaces are immersed in a 2000 ppm solution prepared in the following manner.

i) PRECLEAN: Blood and other body fluids must be thoroughly cleaned with a suitable detergent and rinsed with water before sterilization. Blood and other body fluids should be autoclaved and disposed of according to all applicable federal, state and local regulations for waste disposal.

ii) ACTIVATION: Activate 12.8 fl. Oz. of Oxine with 76 grams of citric acid and wait 20 minutes. Keep mixture covered during activation.

iii) DILUTION: Add activated Oxine to a one (1) gallon container and fill with water to prepare one (1) Gallon of use-solution. Avoid breathing fumes.

iv) STERILIZATION: Immerse equipment, small medical devices and instruments to be sterilized for a minimum of two (2) hours at room temperature (approx. 65-80 degrees Fahrenheit). Do not re-use the solution. Discard solution after each use into a drain with running water.

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7) For use in Dental Offices and Laboratories as a dental pumice disinfectant.

Directions for Use:

i) Prepare solution in a well ventilated area. To make one liter of solution, pour 25.0 ml of Oxine concentrate into a clean plastic container. To this, add 22 grams of BCI Activator Crystals and mix slightly, allowing 5 minutes reaction time and for crystals to dissolve. Once solution has yellowed, dilute to one liter with clean potable water (500 ppm available ClO₂).

ii) To apply: The working solution can be conveniently contained in a one (1) liter plastic "squeeze" bottle for up to one (1) week. Apply the dry pumice powder exactly as water to produce the pumice slurry. Apply additional working solution as needed to reconstitute dried out slurry to appropriate viscosity. Oxine will keep pumice slurry thoroughly disinfected. New Oxine solution should be made up weekly.

IN ANIMAL REARING AND CONFINEMENT FACILITIES

1) To disinfect commercial animal confinement facilities such as poultry houses, swine pens, calf barns and kennels

Directions for Use:

i) Remove all animals and feed from premises, vehicles, enclosures, coops and crates.

ii) Remove all litter and manure from floors, walls and surfaces of barns, pens, stalls, chutes and other facilities and fixtures occupied or traversed by animals.

iii) Empty all troughs, racks and other feeding and watering appliances.

iv) Thoroughly clean all surfaces with soap or detergent and rinse with water.

v) Preparation of active disinfecting solution: Prepare an activated working solution containing 500 ppm available chlorine dioxide according to the activation chart.

vi) To apply: Using commercial sprayer, saturate all surfaces with the activated Oxine solution for a period of ten (10) minutes. Active solutions may be irritating when breathed, therefore, always use an applicable NIOSH/MSHA approved respirator appropriate for chlorine dioxide when spraying these solutions. Immerse all halters, ropes, and other types of equipment used in handling and restraining animals as well as forks, shovels and scrapers used for removing litter and manure. After treatment, ventilate buildings, coops, or other enclosed spaces and allow to air dry. Repopulate when solution had dried. Thoroughly scrub treated feed racks, troughs, automatic feeders, fountains and waterers with soap or detergent and rinse with potable water before use.

2) To control the build-up of odor and slime forming bacteria in animal confinement areas.

Directions for Use:

i) Remove all litter and manure from floors, walls and surfaces of barns, pens, stalls, chutes, cases and other facilities and fixtures occupied or traversed by animals. Thoroughly clean all surfaces with soap or detergent and rinse with clean water.

ii) Preparation of solution: Place 6 ½ fl. oz. Oxine concentrate into a clean, plastic container. Dilute concentrate with one (1) gallon clean, potable water.

iii) To apply: Using a commercial sprayer, saturate all surfaces with the Oxine[®] solution. When spraying Oxine solutions, always use an applicable NIOSH/MSHA approved respirator appropriate for chlorine dioxide to avoid breathing mist.

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3) To control animal odors on pets and in litter boxes, carpets and concrete floors.

Directions for Use:

i) For litter boxes: Wash out litter boxes with suitable detergent and rinse with clean, potable water. Soak overnight in solution of one (1) oz. Oxine per one (1) quart of water (650 ppm available chlorine dioxide). Add litter, sprinkle surface liberally with Oxine® solution.

ii) For controlling odors in carpets: Add 3 oz. Oxine per gallon (500 ppm available chlorine dioxide) of rug shampoo mix or 3 oz. Oxine per each gallon of rinse water. Shampoo carpet. Allow to air dry. CAUTION: Oxine may bleach some carpets and fabrics, especially if applied on top of another chemical agent. Do not apply until a sample test has been tried and observed for a least 24 hours.

iii) For concrete floors: Clean floor thoroughly using a suitable detergent; rinse with clean water. Prepare solution by adding 8 oz. (1250 ppm available chlorine dioxide) Oxine per gallon of water. Mop or spray solution liberally onto floor. Allow to air dry.

iv) For animal baths: Wash animal well with appropriate pet shampoo; rinse with clean water. Prepare solution by adding ¼ oz. Oxine (80 ppm available chlorine dioxide) per gallon of water. Rinse animal thoroughly with prepared solution. Allow to air dry. Avoid direct contact with animal's eyes, nose and ears.

v) For treating animal odors with high levels of ammonia: Wash area thoroughly with suitable detergent and rinse with clean water. Preparation of solution: Place 4 oz. Oxine into a clean, plastic container. To this concentrate add 1 tablespoon household bleach and allow to react for five (5) minutes. Dilute with 1 gallon clean, potable water. Apply by mopping or spraying solution liberally onto area. Allow to air dry. Additional applications may be necessary.

4) To control the build up of slime and odor causing bacteria in feed waters.

Directions for Use:

i) Feed water should be treated at the rate of one (1) fl. oz. Oxine per 30 gallons of water (5 ppm available chlorine dioxide) and may be injected or batch loaded.

ii) Feed water storage tanks should be sufficiently sealed to prevent outside contamination and direct sunlight.

IN WATER TREATMENT AND WATER STORAGE SYSTEMS

1) To disinfect water storage systems aboard aircraft, boats, RV's, and off-shore oil rigs.

Directions for Use:

i) Prior to disinfection, tanks should be cleaned using a suitable detergent and thoroughly flush with clean, potable water. There is both a ten (10) minute and a one (1) hour disinfection procedure to choose from.

ii) Preparation of active solution: For ten (10) minute procedure: Preparation of active solution: Prepare an activated working solution containing 500 ppm available chlorine dioxide according to the activation chart. Pour activated solution into tank and dilute with clean potable water, filling the tank completely, at the rate of one gallon for each 3 ¼ oz. Oxine. Bleed air out of lines and allow to stand at least ten (10) minutes. Drain tank and lines and flush with potable water. For one (1) hour procedure: Preparation of active solution: Prepare an activated working solution containing 50 ppm available chlorine dioxide according to the activation chart. Pour activated solution into tank completely, at the rate of ten (10) gallons for each 3 ¼ fl. oz. Oxine. Bleed air out of lines and allow to stand at least one (1) hour. Drain tank and lines then fill with potable water.

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2) To control build-up of slime and odor causing bacteria and enhance the taste of stored potable water.

Directions for Use:

- i) Prior to treatment of potable water, thoroughly clean and disinfect the water storage system to ensure a sanitary condition. Thoroughly rinse with clean, potable water.
- ii) Potable water should be treated at a rate of one (1) fl. oz. Oxine per 30 gallons potable water (5 ppm available ClO₂) and may be injected or batch treated.
- iii) Water storage tank should be sufficiently sealed to prevent outside contamination and direct sunlight.
- iv) Using a Bio-Cide test kit, confirm the chemical level to be 5 ppm and check to see this level does not fall below 1 ppm

3) To help remove off odors and tastes from municipal well waters.

Direction for Use:

- i) Oxine should be injected into the incoming water main using a chemical proportioning pump or injector at a rate of 1.0 fl. oz. Oxine per 150 gallons water (1.0 ppm available ClO₂).
- ii) Confirm pump or injector accuracy using a Bio-Cide test kit and adjust accordingly.
- iii) Oxine levels should be checked weekly.

IN INDUSTRIAL APPLICATIONS

1) For use as a slimicide in pulp and paper white water systems

Directions for Use:

- i) For initial start-up or for severe slime contamination Oxine should be prepared by the addition of eight ounces of citric acid activator per 50 gallons of Oxine or by addition of other suitable acid to adjust the Oxine solution to approximately pH 7.0.
- ii) The activated Oxine solution should then be proportioned into the white water system by means of a suitable metering pump at a continuous rate to produce an in-stream concentration of 1.25 – 5.0 ppm. This concentration is obtained by proportioning the Oxine into the system at a rate of 0.8 to 3.2 fluid ounces per 100 gallons of process water. The system should be monitored by use of a Bio-Cide test kit, or other suitable means, and feed rate adjustments made accordingly. After slime control is established the Oxine feed rates may be lowered to maintain the desired level of slime control.

2) For enclosed and recirculating cooling water systems

Directions for Use:

- i) Severely fouled systems should be cleaned prior to treatment.
- ii) For initial startup or heavy microbial contamination Oxine should be added to the cooling water system at a rate of one gallon of Oxine per 4,000 gallons of system water. This is equivalent to 5.0 ppm as available chlorine dioxide. Dosage should be repeated daily until microbial control is achieved.
- iii) When microbial contamination is under control the concentration and frequency of treatment may be reduced to levels adequate to maintain the desired level of microbial control.

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VENTILATION SYSTEMS
Residential-Commercial-Institutional

1) To sanitize hard surfaces associated with ventilation and air conditioning duct work.

Directions for Use:

i) Prior to sanitization, duct work should be mechanically cleaned, vacuumed or blown free of dirt, dust, mold and debris, using a commercially available duct cleaning system or service.

ii) Preparation of sanitizer solution: Place 3 and ¼ fl. oz. of Oxine concentrate into a clean plastic container and add 10 grams of BCI Activator Crystals or food grade citric acid of no less than 99% purity. Prepare in a well ventilated area. Avoid breathing any fumes while the crystals are dissolving. Allow five minutes reaction time. To this solution add one gallon of clean potable water. (500 ppm ClO₂)

iii) To apply: Spray or fog sanitizer solution into duct work using a suitable spraying or fogging device. Make sure that the surfaces are thoroughly wet for at least ten (10) minutes. During application, area must be closed as tightly as possible and sealed. After spraying or fogging, the area should be opened and aired for one (1) hour before repopulating. Active solutions may be irritating when breathed, therefore, always use an applicable NIOSH/MSHA approved respirator appropriate for chlorine dioxide when fogging or spraying these solutions. After application, allow to air dry. Treat as required. Always apply freshly made solutions.

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STORAGE AND DISPOSAL

Product Storage: Store in a cool, dry, well-ventilated location away from acids, chlorine and chlorine compounds, hypochlorites (bleach), organic solvents, sulfur and sulfite compounds, phosphorus, combustible/flammable materials, and direct sunlight. Keep containers tightly closed when not in use and open carefully to prevent spillage. Storage on wooden floors and pallets is not recommended. Do not contaminate water, food, or feed by storage or disposal.

Container Disposal: Triple rinse. Then offer for recycling or reconditioning; or puncture and dispose of in a sanitary landfill; or by incineration; or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

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

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or public 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 sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA.

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FIRST AID Class IV	
<i>If inhaled</i>	<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.
<i>If on skin or clothing</i>	<ul style="list-style-type: none">- Take off contaminated clothing.- Rinse skin immediately with plenty of water for 15-20 minutes.- Call a poison control center or doctor for treatment advice.
<i>If in eyes</i>	<ul style="list-style-type: none">- Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lens, if present, after the first 5 minutes, then continue rinsing eye.- Call a poison control center or doctor for treatment advice.
<i>If swallowed</i>	<ul style="list-style-type: none">- Call a poison control center or doctor immediately for treatment advice.- Have a person sip a glass of water if able to swallow.- Do not induce vomiting unless told to do so by a poison control center or doctor.- Do not give anything by mouth to an unconscious person.
For 24 hour emergency information on this product, call NPIC at 1-800-858-7378 (U.S., Canada, Puerto Rico, Virgin Islands) or 1-703-527-3887 (All Other Areas)	