RESERVOIRS

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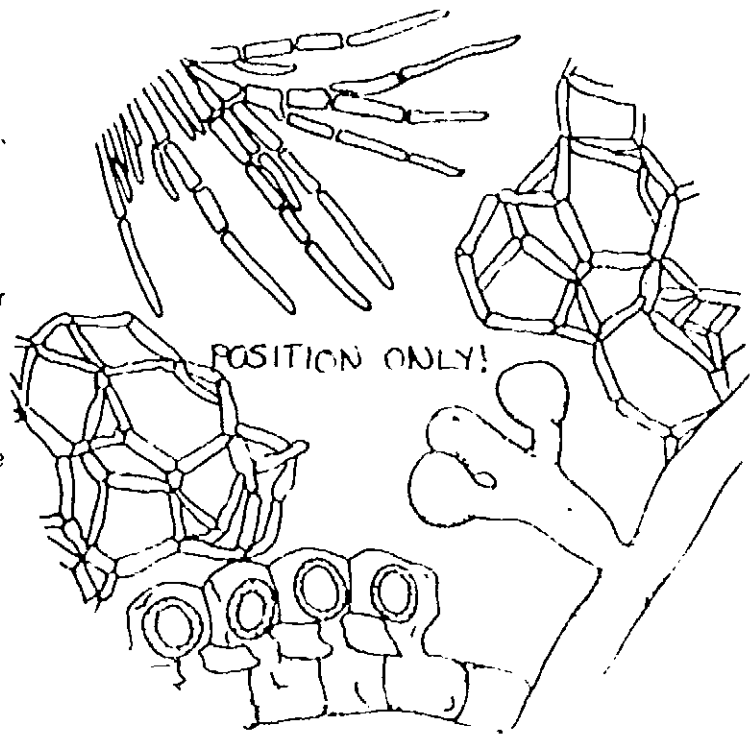
Bacteria control

Contamination of reservoirs is an ever-present possibility. Most frequently, it is caused by careless persons or seepage from ground contamination. In order to keep reservoir water bacteriologically acceptable, it is necessary to test regularly and chlorinate sufficiently to maintain a residual of 0.2 ppm free available chlorine. This is equivalent to 1.2 ounce of calcium hypochlorite per 30,000 gallons of water **after** chlorine demand has been satisfied.

Where contamination is caused by overflowing streams, establish hypochlorinating stations up to [illegible] of the reservoir [illegible] water until the entire [illegible] after a 0.2 ppm available [illegible] residual determined by a chlorine test kit. Where contamination is from [illegible] age, apply sufficient calcium hypochlorite directly to the reservoir to attain a 0.2 ppm available [illegible] all parts of the reservoir.

Daily before [illegible] **away** from the water [illegible] to stand at least [illegible]



ing. Also remember that chlorine demand will be higher during periods of heavy rainfall and extreme dryness or heat.

Continuous feeding of calcium hypochlorite at the input source is usually the most effective means of maintaining an adequate chlorine residual.

When applying granular calcium hypochlorite to surface water, take care to reach all parts of the reservoir with equal amounts of the product so that distribution is complete and equal throughout.

Algae control

[illegible] calcium reser- [illegible] of the [illegible] algae [illegible] methods [illegible] hypo- [illegible] reser- [illegible] should be [illegible] 50 [illegible] of entry [illegible]

[illegible] daily [illegible] to [illegible] 0.2 to 0.5 [illegible] Where [illegible]

scheduled, intermittent feeding should be practiced. In doing so, broadcast calcium hypochlorite over the surface of the reservoir evenly, taking special care to treat shallows and edges. As it descends, the product dissolves, distributing a chlorinating action at all depths.

Introduce a sufficient amount of calcium hypochlorite to provide a residual of from 0.2 to 1.5 ppm for up to 24 hours.

New and newly cleaned reservoirs

New or recently cleaned reservoirs must be completely filled with calcium hypochlorite. Spray all parts and surfaces with 0.5 to 5000 ppm solution of calcium hypochlorite to 1 gallon. When the reservoir is filled as described above. Note. **A precaution, do not store calcium hypochlorite solution. When mixed use immediately.**

WATER MAINS

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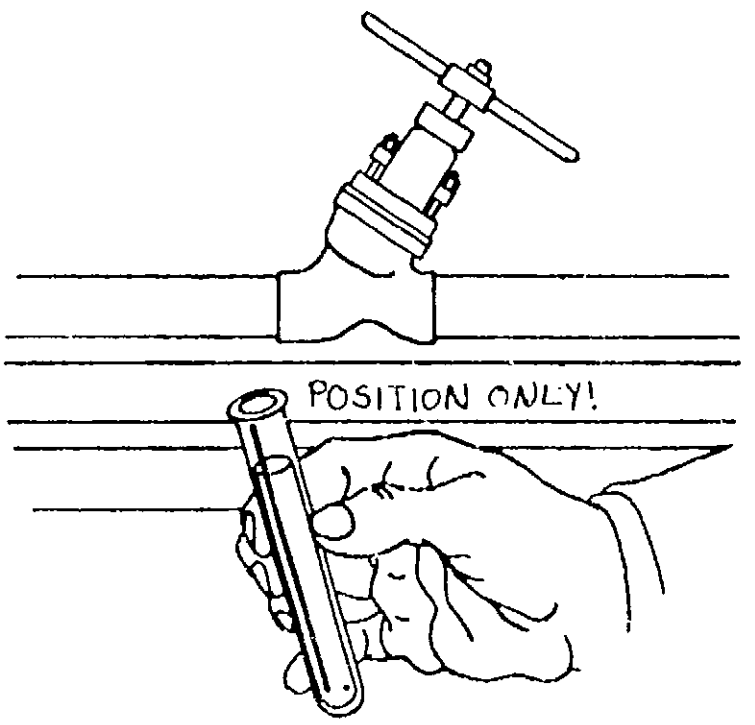
scheduled, intermittent feeding should be practiced. In doing so, broadcast calcium hypochlorite over the surface of the reservoir evenly, taking special care to treat shallows and edges. As it descends, the product dissolves, distributing a chlorinating action to all depths.

Introduce a sufficient amount of calcium hypochlorite to provide a residual of from 0.2 to 1.5 ppm for up to 24 hours.



New and newly cleaned reservoirs

New or recently cleaned reservoirs must be completely disinfected with calcium hypochlorite before use. Spray all parts of the surfaces with a 0.5% - 5.5% ppm solution of calcium hypochlorite to 1 gallon of water. When the reservoir has been disinfected as described above, fill it. **As a safety precaution, do not store calcium hypochlorite solution. When mixed, use immediately.**

[illegible]

Forty-eight hours after the initial treatment, test the water supply again for bacteria and chemicals. If results are unsatisfactory, maintain a 0.4 ppm free chlorine residual in the main until test samples are acceptable for two successive days.

Note: Keep out trench water and other contaminates from new mains by capping the pipe ends before lowering them into place.

WELLS

Municipal authorities often help the residents of rural areas, particularly dairy farmers, safeguard their water supplies as any disease originating there could easily spread throughout the community.

[illegible]

WELLS

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BEST D

rite to produce a free chlorine residual of at least 0 2 ppm and no more than 0 6 ppm after a 20-minute contact period

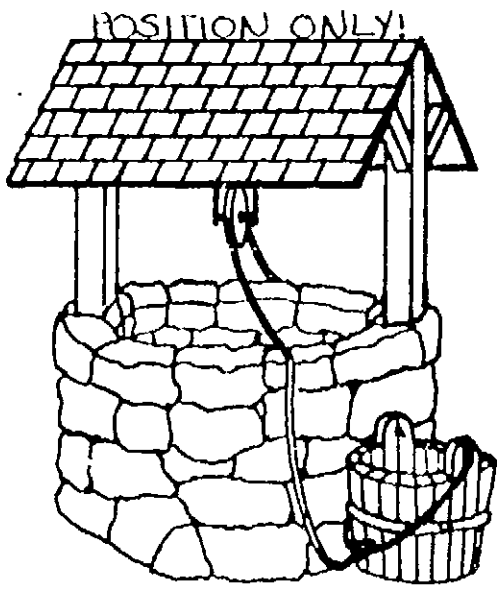
Regular testing is necessary and a record of test readings should be kept

New wells **must** be treated

Public wells

Before using, flush the casing with a 50 ppm available chlorine solution (1 ounce of calcium hypochlorite for each 100 gallons of water) The solution should be pumped or fed by gravity into the well and thoroughly mixed and agitated The well should stand overnight or for twelve hours under chlorination It may then be pumped until bacterial examination of a representative raw water sample [illegible] indicate whether further treatment is necessary

After the initial treatment [illegible] ing a 1% available chlorine solution of this product with a hypochlorite [illegible] directed above until a free available chlorine residual of at least 0.2 ppm and no more than 0 6 ppm is attained throughout the distribution system Check the water frequently with a chlorine test kit Bacteriological sampling must be conducted at a frequency no less than that prescribed by the National Interim Primary Drinking Water Regulations Contact your local Health Department for further details



Private wells

[illegible]

Contact your local Health Department for further details.

Drilled, Driven and Bored Wells Run the pump until the water is as free from turbidity as possible Pour a 100 ppm available chlorine sanitizing solution into the well This solution can be made by thoroughly mixing 1 ounce of this product into 50 gallons of water Add 5 to 10 gallons of clean, chlorinated water to the well to force the sanitizer into the rock formation Wash the exterior of the pump cylinder with the sanitizer Drop the pipeline into the well, start the pump and pump water until a strong [illegible] chlorine in the water [illegible] At this point stop the pump and let it sit at least 24 hours After 24 hours flush [illegible] chlorine have [illegible] from the water Deep [illegible] wells may necessitate the use of special methods for [illegible] the sanitizer into the well Contact your local Health Department for further details

Artesian Wells Artesian [illegible] require disinfection [illegible] constant contact [illegible] disinfection [illegible] Health [illegible] Follow the [illegible] free chlorine [illegible] in the well [illegible]

Granular calcium hypochlorite may be used as a sanitizer in water treatment plants when the system is too small to require gas chlorination equipment or to supplement well or reservoir chlorination.

Treatment plants also rely on granular calcium hypochlorite to aid in algae control As algae may be the source of many objectionable odors, cause mud balls and slime in filters, pipes and pumps, as well as reduce pipeline capacity, its control through chlorination is an important factor

The presence of algae is often indicated by a slimy, gelatinous film on the inside of pumps lines, and mixers, etc It may be eliminated by [illegible] ding a sufficient quantity of [illegible] cium hypochlorite to the fore pump well to obtain a 5 0 to 10 [illegible] residual chlorine reading after 2 [illegible] contact time

The dosage necessary to pr[illegible] reading will vary with condition[illegible] hot weather will increase the [illegible] treatment It should be controll[illegible] actual test

New tanks, basins, etc.

Remove all physical soil from th[illegible] Introduce 4 ounces of ca[illegible] hypochlorite for each 5 cubic fe[illegible] working capacity (200 ppm av[illegible] chlorine) Fill to working capac[illegible] [illegible] for a [illegible] hours Drain [illegible] with [illegible]

TREATMENT PLANTS

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Granular calcium hypochlorite may be used as a sanitizer in water treatment plants when the system is too small to require gas chlorination equipment or to supplement well or reservoir chlorination.

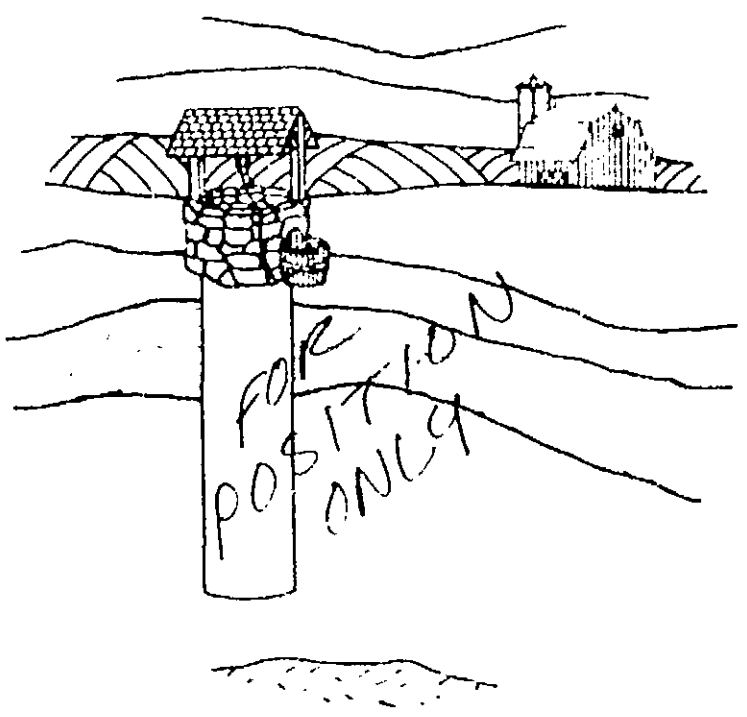
Treatment plants also rely on granular calcium hypochlorite to aid in algae control. As algae may be the source of many objectionable odors, cause mud balls and slime in filters, pipes and pumps, as well as reduce pipeline capacity, its control through chlorination is an important factor.

The presence of algae is often indicated by a slimy gelatinous film on the inside of pumps, fine screens, motors, etc. It may be eliminated by adding a sufficient quantity of calcium hypochlorite to the forebay or pump well to obtain a 5.0 to 10.0 ppm residual chlorine reading after 24 hours contact time.

The dosage necessary to prevent algae growth will vary [illegible] not well [illegible] treatment. It must be determined by actual test.

New tanks, basins, etc.

[illegible]



New filter sand

Apply the [illegible] calcium hypochlorite [illegible] 150 to 200 [illegible] of sand. The action of the product is [illegible] as the water [illegible] through the bed and disinfects the new sand.

Existing equipment

Remove [illegible] equipment from service. If the previous treatment is not practical, surfaces may be sprayed with a solution containing 1 ounce of this product for each 5 gallons of water (approximately 1000 ppm available chlorine). After drying, flush with water and return to service.

Cooling tower and heat exchange surface

A clogged or fouled system should be mechanically cleaned to remove all physical soil prior to beginning treatment. Initially, treat by adding enough calcium hypochlorite to provide 10 ppm available chlorine (2 ounces per 1000 gallons) as a shock dosage and circulate it thoroughly through the system.

[illegible] for continuous preventive control of algae and slime growth, regularly add [illegible] calcium hypochlorite to the recirculation system to maintain 1.0 ppm free chlorine residual.

Color, water and [illegible] factors such as [illegible] equipment [illegible]

EMERGENCY DISINFECTION

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Emergency uses

Acts of nature or the failure of man-made equipment may jeopardize a community's water supply at any time. Flood waters may contaminate reservoirs and wells, drought may dry up water supplies, fire or power failures may interrupt the operation of pumping or purification facilities, mains may break, and unknown sources can pollute water. All of these emergencies demand prompt action by responsible authorities. Many communities keep standby supplies of calcium hypochlorite ready to meet such problems. It can be stored in closed containers for reasonably long periods without appreciable loss of its effectiveness. When needed, calcium hypochlorite solutions can be quickly prepared to meet many [illegible] and may be applied to water with [illegible] manually.

During [illegible] chlorite may [illegible] to [illegible] water supplies which have been [illegible] contaminated or [illegible] water quickly [illegible]

Wells

[illegible] casing with a [illegible] chlorine [illegible] Mix [illegible] gallons of water. Back wash the well [illegible] and [illegible] chlorine [illegible] After [illegible] hours [illegible] water. After 24 hours, drain [illegible] and return to service. If the previous method is not suitable, spray or flush the equipment with a solution containing 1 ounce of this product for each 5 gallons of water (100 ppm available chlorine). [illegible] flush and [illegible]

Filters

[illegible] replacement. [illegible] hypochlorite [illegible] feet of [illegible] calcium hypo [illegible] over the [illegible] per 20 [illegible] at a [illegible] the [illegible] filter [illegible] and [illegible] hypo- [illegible]

several hours and take a representative water sample. Re-treat the well if water samples are biologically unacceptable.

Basins, tanks, flumes, etc.

Thoroughly clean all equipment, then apply 4 ounces of calcium hypochlorite per 5 cubic feet of water to obtain 500 ppm available chlorine, as determined by a suitable test kit. After 24 hours, drain, flush, and return to service. If the previous method is not suitable, spray or flush the equipment with a solution containing 1 ounce of this product for each 5 gallons of water (100 ppm available chlorine). [illegible] flush and [illegible]

ing the water to stand at a depth of 1 foot above the filter sand. After 30 minutes, drain the water to the level of the filter. After 4 to 6 hours, drain and proceed with normal backwashing.

Distribution system

Flush the repaired or replaced section with water. Establish a hypochlorinating station and apply sufficient product until a consistent available chlorine residual of at least 10 ppm remains after a 24-hour retention time. Use a chlorine test kit.

Cross connections or emergency connections

Hypochlorination or gavity feeding equipment should be set up near the [illegible] of the untreated water supply. [illegible] sufficient product to give a chlorine residual of at least 0.1 to 0.2 ppm at the point where the untreated water enters the regular distribution system. Use a chlorine test kit.

EMERGENCY DISINFECTION

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Distribution system

Flush the repaired or replaced section with water Establish a hypochlorinating station and apply sufficient product until a consistent available chlorine residual of at least 10 ppm remains after a 24-hour retention time Use a chlorine test kit

Cross connections or emergency connections

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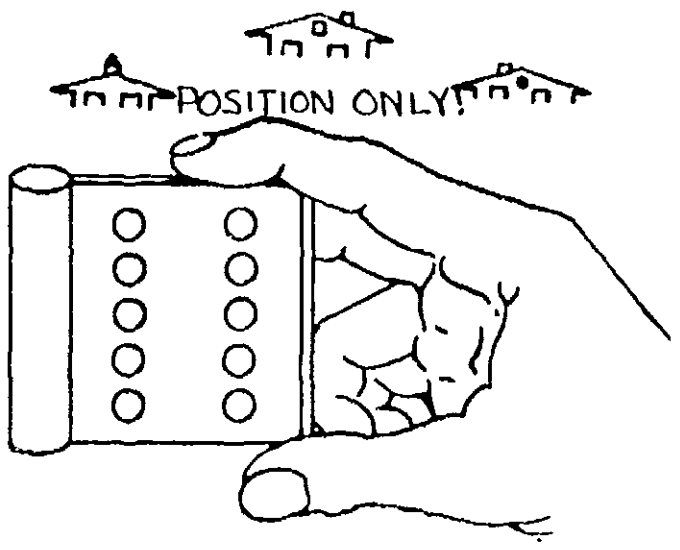

Supplementary water supplies

Gravity or [illegible] hypochlorinator [illegible] supplementary line [illegible] the water to [illegible] 0.2 ppm after [illegible] minutes [illegible] Use a chlorine test kit

Water shipped in by tanks, tank cars, trucks, etc.

[illegible]

able chlorine solution and rinse with potable water after letting stand 5 minutes This solution is made by mixing 1 ounce of calcium hypochlorite for each 5 gallons of water. During the filling of the containers, dose with sufficient amounts of this product to provide at least a 0 2 ppm chlorine residual. Use a chlorine test kit

Individual water supplies

Where boiling of water for 1 minute is not practical water can be made potable by using calcium hypochlorite **Prior** to addition of the sanitizer remove all suspended material by filtration or by allowing it to settle to the bottom Decant the **clarified** contaminated water to a clean container and add 1 grain of calcium hypochlorite to 1 gallon of water One grain is approximately the size of the letter O in this sentence Allow the treated water to stand for 30 minutes Properly [illegible] water **should** have a slight chlorine [illegible] for [illegible] dosage and [illegible] the water to stand an additional [illegible] minutes The treated water can then be [illegible] potable by [illegible] be-[illegible] time

SEWAGE TREATMENT

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B.O.D. reduction

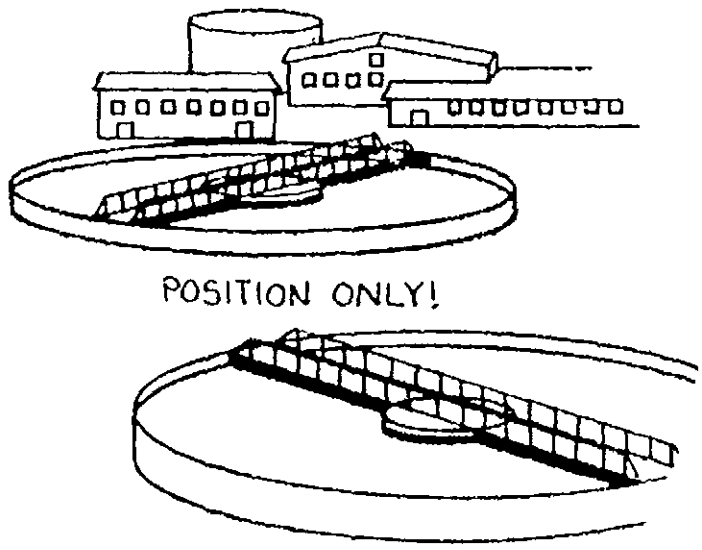
B O D , or Biochemical Oxygen Demand, is the quantity of oxygen required to oxidize the polluting substance to a biochemically inert material As little as 1 part per million of chlorine may bring about a reduction of 2 to 3 ppm in B O D Calcium hypochlorite for this purpose may be added at virtually any point in the system

To achieve maximum results in terms of desirable aerobic action and retardation of anaerobic decomposition hypochlorination should be complete The treatment will still be of value however even if the amount of calcium hypochlorite applied is less than the total amount which could be utilized

Odor control

The most effective [illegible] in sewage treatment is [illegible] sulfide [illegible] splitting [illegible] sewage

Hydrogen sulfide can be effectively controlled by [illegible] hypochlorination of the [illegible] age which destroys the sulfide [illegible] and bacteria [illegible] treatment of the sewage is not [illegible] chlorine [illegible] where [illegible] The amount required will [illegible] determined [illegible]



[illegible]

Disinfection of sewage and wastewater effluent

[illegible]

an effective and dependable means of destroying harmful bacteria in effluent The amount required depends on the type of sewage to be treated Raw sewage may require as much as 30 ppm available chlorine, while secondary treated sewage may need as little as 3 ppm

The disinfection of sewage effluent must be evaluated by determining the total number of coliform bacteria and/or fecal coliform bacteria, as determined by the Most Probable Number (MPN) procedure, of the chlorinated effluent This must be reduced to or below the maximum permitted by the controlling regulatory jurisdiction

On the average satisfactory disinfection of secondary wastewater can be obtained when the [illegible] is 0.5 ppm [illegible] Although [illegible] critical factor [illegible] degree of contact with bacterial [illegible] the MPN of [illegible] closely related to [illegible] require [illegible] primary [illegible]

The following are critical factors affecting wastewater disinfection:

1 Mixing: It is imperative that the product and the wastewater be instantaneously and completely flash mixed to assure reaction with every chemically active soluble and particulate component of the wastewater

2 Contacting. Upon flash mixing, the flow through the system must be maintained.

3 Dosage/Residual Control Successful disinfection is extremely dependent upon response to fluctuating chlorine demand to maintain a predetermined, desirable chlorine level Secondary effluent should contain 0 2 to 1 0 ppm chlorine residual after a 15- to 20-minute contact time A reasonable average of residual chlorine is 0 [illegible] ppm after 15 minutes contact

Effluent slime control

Apply a 100 to 1000 ppm available chlorine solution at a location which allow complete mixing Prepare solution by mixing 2 to 20 [illegible] calcium hypochlorite with 1[illegible] of water Once control is established 15 ppm available chlorine [illegible] Prepare this solution by mixing [illegible] of the product with 1[illegible] of water

SEWAGE TREATMENT

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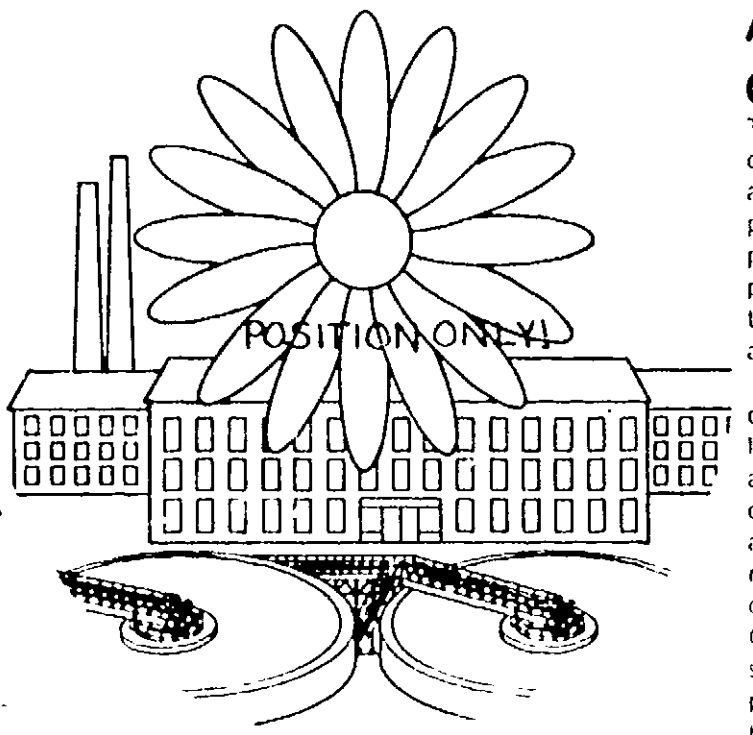

Effluent slime control

Apply a 10[illegible] to 10[illegible] [illegible] solution [illegible] allow complete mixing Prepare the solution by mixing [illegible] to 20 [illegible] of calcium hypochlorite [illegible] of water [illegible] Prepare the [illegible] of the product with [illegible] of water

Filter beds—slime control

Remove the filter from service, drain it to a depth of 1 foot above the filter sand, and add 16 [illegible] of hypochlorite per [illegible] of filter surface Wait [illegible] before draining water to sewer treatment [illegible] toxic [illegible] residual [illegible]

Aid in coagulation

The value of calcium hypochlorite's available chlorine as an aid in coagulation is due primarily to its oxidizing power—a property which is of particular value in sewage treatment because there is almost no oxygen in sewage

Hypochlorination with calcium hypochlorite is particularly helpful when iron salts are used as the primary coagulant Ferric iron in the absence of oxygen, tends to revert to ferrous iron, which is of little value as a precipitant Calcium hypochlorite supplies sufficient oxygen to retard or prevent this change It should be used just before the primary coagulant in a proportion of 3 to 5 ppm

CALCIUM HYPOCHLORITE FOR SWIMMING POOLS

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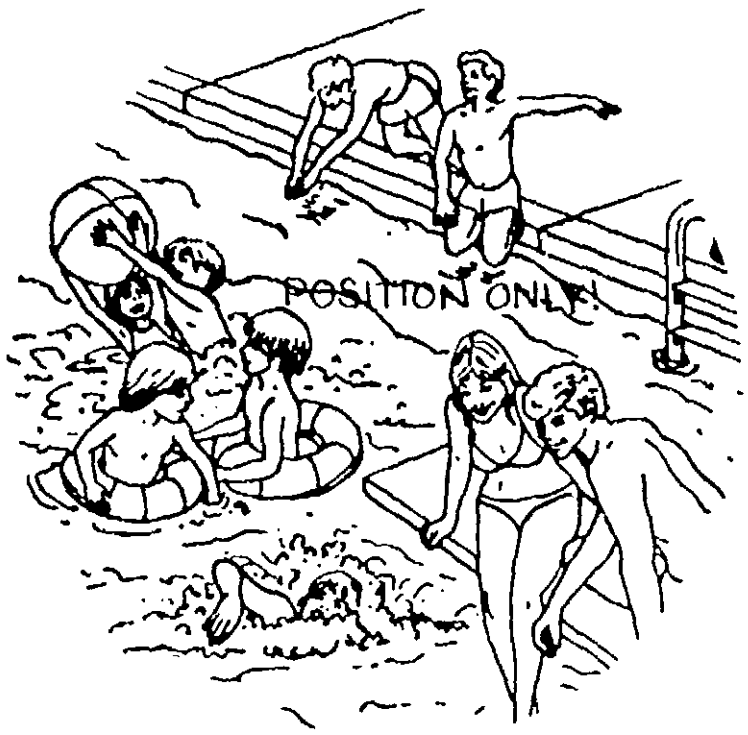
Pool water chlorination

Calcium hypochlorite provides a simple, effective method of treatment for chlorinating swimming pool water. Its use is especially suited to indoor pools. For best results, it is introduced in controlled quantities into the recirculated water. Automatic feed equipment for this purpose is readily available.

For complete information on swimming pool care, refer to the PPG Industries booklet "Crystal Water the Pittclor Way", A-1470. This booklet fully describes the uses and application procedures for PPG's Pittclor, swimming pool additives.



Pool accessory equipment

The possibility for the spread of infectious diseases is heightened wherever bathers gather. To provide proper and effective preventive care, calcium hypochlorite should be used to inexpensively destroy harmful bacteria on swimming pool premises and equipment, including shower rooms, floors and walkways, restroom facilities, diving boards, ladders, etc.

Note: As this product is toxic to fish and other aquatic life, treated water should not be discharged where it will drain into streams, rivers, lakes or public waters.

SERVICE

[illegible] staff of PPG [illegible] regulation [illegible] of [illegible] swimming [illegible]

PPG calcium hypochlorite is a stable chemical when properly stored and handled. However, it is highly corrosive and a strong oxidizing agent. Calcium hypochlorite is not flammable, but in the presence of contaminates or other chemicals, it can cause fire or explosion.

Everyone who handles calcium hypochlorite must be completely familiar with proper handling, storage, and use procedures as well as first aid and emergency procedures in case of accident.

Note: The U.S. Department of Transportation regulates transportation of calcium hypochlorite as "hazardous material". As serious penalties can be imposed for violation of DOT regulations, everyone who transports these products [illegible] enforcement of these regulations [illegible] them.

PRECAUTIONS AND SAFETY MEASURES

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PPG calcium hypochlorite is a stable chemical when properly stored and handled. However, it is highly corrosive and a strong oxidizing agent. Calcium hypochlorite is not flammable, but in the presence of contaminates or other chemicals it can cause fire or explosion.

Everyone who handles calcium hypochlorite must be completely familiar with proper handling, storage and use procedures as well as first aid and emergency procedures in case of accident.

Note: The U.S. Department of Transportation regulates transportation of calcium hypochlorite as hazardous material. As serious penalties can be imposed for violations of DOT regulations, those who transport these products should be informed of the regulations and follow them.

HANDLING AND STORAGE

[illegible]

In case of fire, drench with water. Since calcium hypochlorite supplies oxygen, attempts to smother the fire with a wet blanket, carbon dioxide or dry chemical extinguisher are ineffective.

Avoid getting in eyes or on clothing. Calcium hypochlorite may produce severe chemical burns. Wear eye protection, gloves, and protective clothing when using this product. Do not breathe dust or fumes.

Be sure to wash your hands after handling calcium hypochlorite.

ENVIRONMENTAL HAZARD

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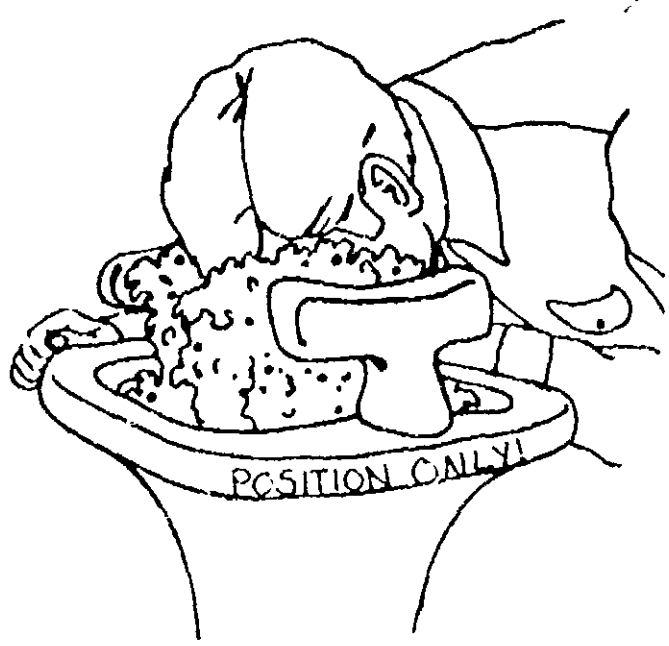
Calcium hypochlorite may produce chemical burns in animals and is toxic to fish. Do not introduce calcium hypochlorite into lakes, streams, ponds, or public waters unless in accordance with NPDES permit.

FIRST AID

Eye or Skin Contact: Flush with plenty of water for at least 15 minutes while removing clothing if it is contaminated. For eye contact, or if skin irritation occurs, get immediate medical attention.

Inhalation: Remove person(s) affected to fresh air. If signs of irritation or discomfort occur, take the person to a hospital or physician immediately.

If Swallowed: If the person is conscious, give large quantities of water to drink followed by [illegible] Milk cooking oil [illegible] if available. Do not induce vomiting. If vomiting occurs, administer additional water. Take the person immediately to a hospital or physician. If the person [illegible] or in convulsions, do not give anything by mouth. Get medical attention immediately.



PREPARING CALCIUM HYPOCHLORITE SOLUTIONS

BEST DOCUMENT AVAILABLE

Each of the applications described in this brochure requires a specific concentration of solution measured in parts per million (ppm) or percent available chlorine. To prepare the proper strength solution, follow these simple directions:

1. Use a clean, **non-metallic** container free of grease, oil or residue.
2. Add granular calcium hypochlorite to lukewarm water.
3. Stir for three to five minutes.
4. Use immediately.

NOTE: As a safety precaution, prepare only the amount of solution needed. Never store a calcium hypochlorite solution.

CALCIUM HYPOCHLORITE MEASUREMENT EQUIVALENTS

Dry Weight	Household Measurement*
1/6 ounce	1 level teaspoon
1/2 ounce	1 level tablespoon
1 ounce	2 level tablespoons
8 ounces	16 level tablespoons (1 cup)

*The household measurement equivalents are only approximate values given for the user's convenience.

The following table indicates the amount of calcium hypochlorite needed to make various quantities of solution containing from 5 to 10,000 ppm available chlorine.

Available Chlorine (ppm)*	Weight of Calcium Hypochlorite Required to Make Solution							
	1 gallon		10 gallons		50 gallons		100 gallons	
	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.
5	0	0.001	0	0.01	0	0.05	0	0.10
10	0	0.002	0	0.02	0	0.10	0	0.21
25	0	0.005	0	0.05	0	0.26	0	0.51
50	0	0.01	0	0.10	0	0.51	0	1.03
100	0	0.02	0	0.21	0	1.03	0	2.05
150	0	0.03	0	0.31	0	1.54	0	3.08
200	0	0.04	0	0.41	0	2.05	0	4.11
300	0	0.06	0	0.62	0	3.08	0	6.16
500	0	0.11	0	1.02	0	5.13	0	10.27
600	0	0.12	0	1.23	0	6.16	0	12.32
1000	0	0.21	0	2.05	0	10.26	1	4.53
2500 (2.5%)	0	0.51	0	5.13	1	9.66	3	3.32
5000 (5%)	0	1.03	0	10.26	3	1.32	6	6.65
10,000 (1%)	0	2.05	1	4.53	6	6.65	12	13.29

*[illegible]

BEST DOCUMENT AVAILABLE

Calcium Hypochlorite Marketing Specialists

Ashford, Connecticut 06278

Houston, Texas 77069

Jacksonville, Florida 32223

Edgewood, Kentucky 41017

Area and District* Sales Offices

Charlotte, North Carolina 28210

Chicago (Rosemont), Illinois 60018

*St. Louis, Missouri 63105

Cleveland, Ohio 44130

*Cincinnati, Ohio 45246

Houston, Texas 77069

New York (West Orange, New Jersey) 07052

Philadelphia (Haddonfield, New Jersey) 08033

San Francisco (Burlingame), California 94010

*Los Angeles (Whittier) California 90603

PPG Chemicals Toll Free.
1 + 800 + CHEM PPG

PPG

CALCIUM HYPOCHLORITE

Multi-Purpose Disinfectant And Sanitizing Agent

748-239
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AGRICULTURAL farm buildings and enclosures poultry plants harvested potatoes harvested sweet potatoes mushrooms bee cells and boards harvested fruits harvested vegetables seeds **AQUACULTURAL** fish ponds fish pond equipment maine lobster ponds conditioning live oysters control of scavenger fish in hatchery ponds boat hulls **BEVERAGE PLANTS** breweries fermenting tubs false bottom[illegible]g equipment malting areas aging cellars water supplies carbo[illegible]age plants water supplies pumps cider plants wineries plant[illegible]tion vessels vats casks presses grape crushers bottles corks mold control tanks grape juice plants **FOOD PROCESSING PLANTS** egg breaking operations cups knives trays breaking rooms freezers pipelines fish processing plants equipment treating packaging pecan cracking and bleaching bacteria control sugar refineries dust collectors vacuum pans sugar bags beet sugar processing canneries coolant water wastes meat processing plants rooms equipment utensils **DAIRY INDUSTRIES** creameries ice cream factories cheese factories milk plants processing equipment weigh tanks pasteurizers homogenizers fillers sanitary piping bottle fillers can fillers tank trucks **INSTITUTIONAL, COMMERCIAL, AND HOME** sanitizing nonporous food contact surfaces sanitizing porous food contact surfaces sanitizing nonporous non-food contact surfaces sanitizing porous non-food contact surfaces disinfecting nonporous non-food contact surfaces general disinfection controlling mold or mildew bathrooms asphalt or wood roofs sidings **SANITIZING DIALYSIS MACHINES** preparing calcium hypochlorite solutions

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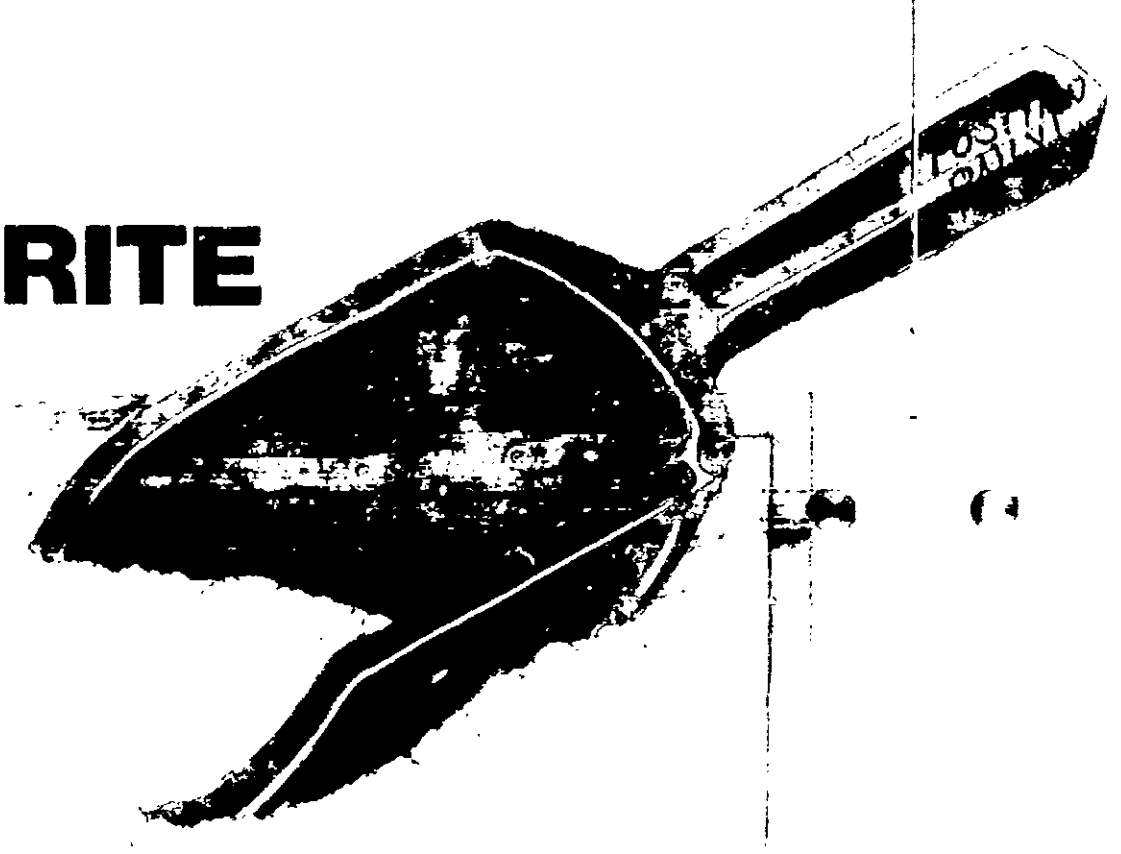
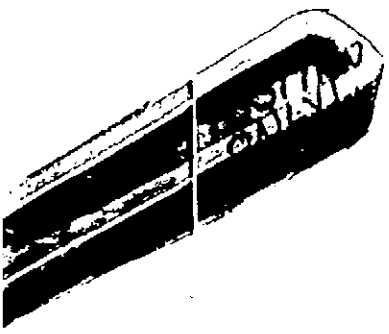
BEST DOCUMENT AVAILABLE

CALCIUM HYPOCHLORITE



POSITION ONLY!

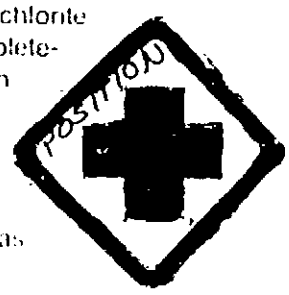
NOTE: Calcium Hypochlorite refers to the following products: INDUCLOR™ - EPA Reg. No. 748-239, PITCHLOR® - EPA Reg. No. 748-274, PITTABS® - EPA Reg. No. 748-138, and Calcium Hypochlorite FR - EPA Reg. No. 748-216



PRECAUTIONS AND SAFETY MEASURES

PPG calcium hypochlorite is a able chemical when properly stored and handled. However it is highly corrosive and a strong oxidizing agent. Calcium hypochlorite is not flammable but in the presence of contaminates or other chemicals it can cause fire or explosion.

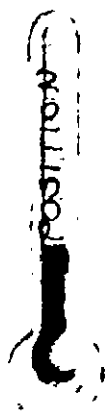
Everyone who handles calcium hypochlorite must be completely familiar with proper handling, storage, and use procedures as well as first aid and emergency procedures [illegible]



Note: The U.S. Department of Transportation [illegible] transportation of calcium hypochlorite as hazardous material. As an oxidizer calcium hypochlorite is regulated [illegible]

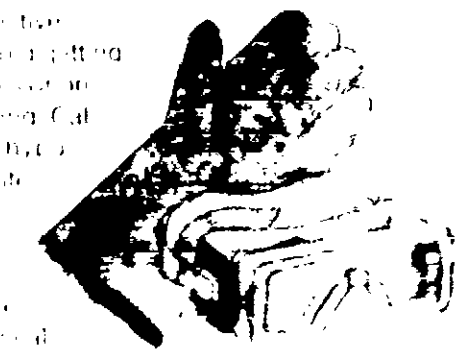
HANDLING AND STORAGE

Before using calcium hypochlorite, read all label directions on the container. All handling and storage directions on the container must be followed to ensure accident-free use of the chemical.



Do not slide or drop calcium hypochlorite containers. Store the chemical in its original container in a cool, dry place. Be sure the calcium hypochlorite container is tightly closed when not in use. Keep calcium hypochlorite away from heat sources, sparks, open flames, and lighted tobacco products.

In case of fire, drench with water. Since calcium hypochlorite supplies oxygen, attempts to smother the fire with a wet blanket, carbon dioxide or dry chemical extinguishers are ineffective.



Avoid getting [illegible] in clothing. Calcium hypochlorite [illegible] Wear [illegible]

Use only a clean, dry scoop made of plastic each time calcium hypochlorite is taken from the container. Add calcium hypochlorite only to water. A fire or explosion may result if calcium hypochlorite is mixed with other chemicals, contaminated with acids, or brought into contact with any other easily combustible materials such as oil, kerosene, gasoline, paint products and any other organic materials.

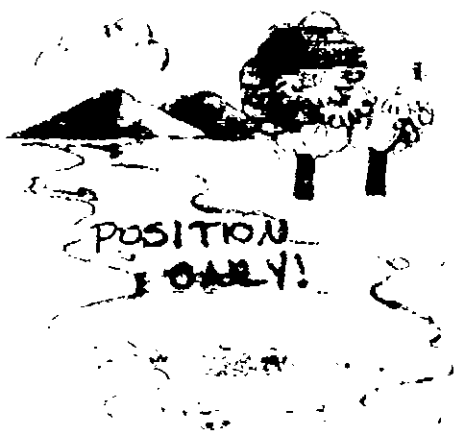
In Case Of Spill Or Leak

Use extreme caution. Contamination may cause fire or violent reaction. If fire or reaction occurs in area of spill, douse with plenty of water. Otherwise, sweep up spilled material using a clean dry shovel and broom and dissolve spilled material in water. Use the solution immediately as directed.

Do not reuse empty calcium hypochlorite containers. They should be rinsed with water, then disposed of

ENVIRONMENTAL HAZARD

Calcium hypochlorite may produce chemical burns in animals and is toxic to fish. Do not introduce calcium hypochlorite into lakes, streams, ponds, or public waters unless in accordance with NPDES permit.



FIRST AID

Eye or Skin Contact. Flush with plenty of water for at least 15 minutes while removing clothing if it is contaminated. For eye contact, or if skin irritation occurs, get immediate medical attention.

Inhalation. Remove person(s) affected to fresh air. If signs of irritation or discomfort occur, take the person to a hospital or physician immediately.

If Swallowed. If the person is conscious, give large quantities of water to drink followed by any common vegetable cooking oil if available. Do not induce vomiting. If vomiting occurs, administer additional water. Take the person immediately to a hospital or physician. If the person is unconscious or unconvulsing, do not attempt to induce vomiting or give anything by mouth. Get medical attention immediately.

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AGRICULTURAL USES:

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Farm Buildings and Enclosures

Regularly clear all livestock, poultry, and other animals as well as their feed from premises, enclosures, vehicles, etc. Clean all litter and manure from floors, walls and surfaces of facilities occupied or traversed by animals or poultry. Empty all troughs and other feeding and watering devices. Thoroughly clean all surfaces with soap or detergent and rinse with water. Disinfect by saturating all surfaces with a solution of at least 1000 ppm available chlorine* for a period of 10 minutes. Also, immerse all halters, ropes, cages, and other equipment used in handling and restraining animals or poultry, the cleaned forks, shovels and scrapers used for removing litter and manure in this solution. Ventilate the buildings, vehicles and closed spaces. Do not re-house livestock or poultry or re-employ equipment until chlorine has been dissipated. Disinfected feed racks, automatic feeders, fountains and waterers must be rinsed with potable water before use.

Poultry Plants

Calcium hypochlorite [illegible] control odors and bacteria in poultry feeding and dressing plants. Poultry feeding areas, droppings and feeding troughs and water [illegible] should receive regular treatment with solutions containing [illegible] available chlorine.

Spray or fog droppings [illegible] feeding troughs thoroughly with the solution.

Watering fountains should be rinsed with this solution. In float control fountains, treat poultry drinking water with 1 oz. of calcium hypochlorite by using a gravity feeder. In refillable fountains treat poultry drinking water by adding 1 oz. of calcium hypochlorite for every 1000 to 5000 gallons of poultry drinking water.

Clean poultry dressing areas regularly before treatment. Immediately after, spray the walls, tables, floors and ceilings with a solution containing 500 [illegible] ppm available chlorine. Clean equipment and utensils should be [illegible]

POSITION ONLY!

[illegible] ppm available [illegible] solution. After [illegible]

Harvested Potatoes

[illegible]

Harvested Sweet Potatoes

To control and reduce the spread of soft rot causing organisms in water and on sweet potatoes (Ipomoea batatas) spray potatoes with a 150 to 500 ppm solution for 2 to 5 minutes.

If a dip is used, monitor the solution hourly and add enough calcium hypochlorite to the solution to maintain the 150 to 500 ppm level. Or, change the solution hourly (or as frequently as necessary) to prevent the available chlorine level from dropping too low.

Mushrooms

To control bacterial blotc[illegible] monas tolaasii), apply a 10[illegible] solution prior to watering m[illegible] production surfaces. The fi[illegible] tion should begin when pin[illegible] thereafter between breaks [illegible] basis depending on the occ[illegible] bacterial blotch. Calcium h[illegible] may be applied directly to [illegible] trol small infection foci. Ap[illegible] oz. per square foot of grow[illegible]

Bee Cells and Boar[illegible]

Immerse leafcutting bee[illegible] bee boards in a solution co[illegible] ppm available chlorine for [illegible] disinfect. Allow cells to dra[illegible] utes and dry for 4 to 5 hou[illegible] chlorine odor can be detec[illegible] solution is made by thorou[illegible] 1-4 Tsp. of calcium hypoch[illegible] gallons of water. Bee domic[illegible] infected by spraying with [illegible] solution until all surfaces [illegible] ly covered. Allow the dom[illegible] until chlorine odor has di[illegible] before placing in use.

BEST DOCUME[illegible]

Mushrooms

To control bacterial blotch (Pseudomonas toloasii), apply a 100 to 200 ppm solution prior to watering mushroom production surfaces. The first application should begin when pins form and thereafter between breaks on a need basis depending on the occurence of bacterial blotch. Calcium hypochlorite may be applied directly to pins to control small infection foci. Apply 1.5 to 2.0 oz. per square foot of growing space.

Bee Cells and Boards

Immerse leafcutting bee cells and bee boards in a solution containing 1 ppm available chlorine for 3 minutes to disinfect. Allow cells to drain for 2 minutes and dry for 4 to 6 hours or until the chlorine odor can be detected. The solution is made by [illegible] 1.4 tsp of calcium hypochlorite [illegible] gallons of water. Bee [illegible] [illegible]

Harvested Fruits

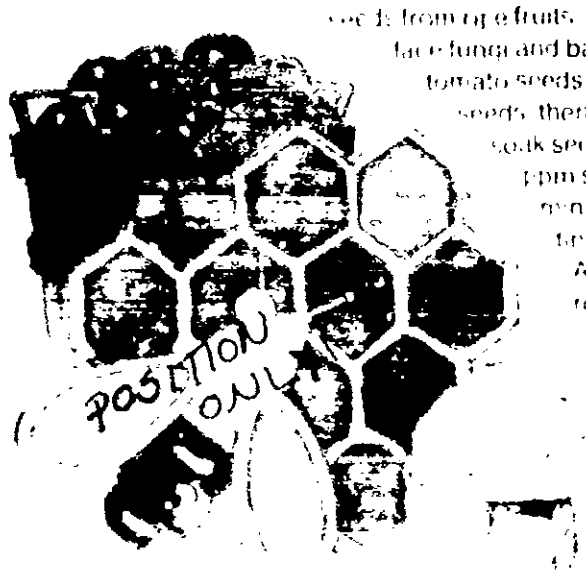
Calcium hypochlorite solutions containing 25 ppm available chlorine can reduce harmful bacteria and improve the keeping properties of fruit. First clean all fruit in wash tank. Then, prepare a 25 ppm available chlorine solution. Soak the fruit for two minutes in the solution, then rinse with potable water.

Harvested Vegetables

First remove surface soil and debris from vegetables in a wash tank. After draining, disinfect by submerging vegetables in a second wash tank for two minutes while circulating a 25 ppm available chlorine solution. After this washing, spray rinse with fresh calcium hypochlorite solution, rinse with potable water and then package.

Seeds

Bacterial spot (Xanthomonas vesicatoria) on tomatos seeds may be controlled by initially removing moist seeds from ripe fruits. To control surface fungi and bacteria on tomato seeds initially wash seeds, then immediately soak seeds in 39,000 ppm solution for 15 minutes with continuous agitation. After treatment [illegible] potable water [illegible]



AQUACULTURAL USES:

Fish Ponds

Remove all fish from ponds prior to treatment. Thereafter, thoroughly mix 20 oz. of calcium hypochlorite for each 10,000 gallons of pond water. Repeat the treatment if the available chlorine level is below 1 ppm after 5 minutes. Return fish to the pond after the available chlorine level reaches zero.

Fish Pond Equipment

Clean all physical soil from equipment prior to treatment. Soak equipment in a solution of 200 ppm available chlorine. Porous equipment should soak for one hour.

Maine Lobster Ponds

Remove lobsters, seaweed, etc. from ponds prior to treatment. Drain the pond and thoroughly mix 75 pounds of calcium hypochlorite to each 10,000 gallons of pond water. Apply evenly so that all barrows, gate [illegible], leaks, and dam are treated with the product. [illegible] tide to fill the pond and then [illegible] gates. Allow water to stand for [illegible] days until the available chlorine level reaches zero. Open gates [illegible] tidal [illegible] returning lobsters to the pond.

Conditioning Live Oysters

Mix 1 oz. of this product completely with each 10,000 gallons of water at 50 to 70 degrees F. Expose the oysters to this solution for at least 15 minutes, monitoring the available chlorine level to be sure it does not fall below 0.05 ppm. Repeat the entire process if the available chlorine level drops below 0.05 ppm or the temperature falls below 50 degrees F.

Control of Scavenger Fish in Hatchery Ponds

Prepare a 200 ppm solution. Pour into drained pond potholes and repeat if necessary. Do not replace desirable fish into refilled ponds until chlorine residual has dropped to 0 ppm, as determined by a test kit.

Boat Hulls

To control slime on boat hulls, sling a plastic tarp under the boat, retaining enough water to cover the fouled bottom area. Do not allow additional water to enter enclosed area. This envelope should contain approximately 500 gallons of water for a 14 foot boat. Add 1.5 oz. of calcium hypochlorite to the enclosed water to obtain a 35 ppm available chlorine concentration. [illegible] for 8 to 12 hours. Repeat if necessary. Do [illegible] until [illegible] has dropped [illegible]

BEVERAGE F

Breweries

Calcium hypochlorite solution enable breweries to prevent bact growth and assure the purity an taste of their products on a cont basis.

As a general sanitizer, calcium chlorite is doubly effective becau its dissolving action on beer ston teins, slime, yeast, and other mat commonly found in brewery line tanks, hoses, etc.

To prepare a stock cleaning a sanitizing solution, add 5 pound calcium hypochlorite to three ga of warm water in a 20-gallon con Introduce 3 pounds of soda ash until dissolved. Dilute this mixtur cold water to make 15 gallons of tion, then add 5 pounds of Pels caustic soda beads. Stir to dissol allow to stand. When diluted 1-t with water, this solution is an exc cleaner, sanitizer for piping and e ment, steel, tile and concrete vat Rinse equipment with potable w before reuse.

Filter Pulp:

Calcium hypochlorite solution [illegible] colloidal deposits and co matter on wood pulp being used filtering agent, thereby restoring more efficiency.

Wash the wood pulp filter mas as at manner. Shut off washer [illegible] after washing. Add 1 oz. of c hypochlorite for each gallon of w the washer to remove colloidal de Run the washer with solution for minutes. If a washer is not used the pulp in water containing 1 oz. calcium hypochlorite per 10 gall [illegible] per. Remove pulp after letting [illegible] for 10 - 15 minutes at 150 degre [illegible] with potable water.

BEVERAGE PLANTS:

BEST DOCUMENT AVAILABLE

trol of Scavenger Fish tchery Ponds

e a 200 ppm solution. Pour ned pond potholes and repeat ary. Do not replace desirable refilled ponds until chlorine has dropped to 0 ppm, as ned by a test kit

Hulls

ontrol slime on boat hulls: sling tarp under the boat, retaining water to cover the fouled area. Do not allow additional ter to enter enclosed area. This envelope should contain approximately 500 gallons of water for a 14 foot boat. Add 3.5 oz. of calcium hypochlorite to the enclosed water to obtain a 35 ppm available chlorine concentra Leave immersed for 8 to 12 s. Repeat if necessary. Do discharge the solution until free chlorine level has dro to 0 ppm, as determined by a swimming pool test kit

Breweries

Calcium hypochlorite solutions enable Breweries to prevent bacterial growth and assure the purity and fresh taste of their products on a continuing basis.

As a general sanitizer, calcium hypochlorite is doubly effective because of its dissolving action on beer stone, proteins, slime, yeast, and other matter commonly found in brewery lines, tanks, hoses, etc.

To prepare a stock cleaning and sanitizing solution, add 5 pounds of calcium hypochlorite to three gallons of warm water in a 20 gallon container. Introduce 3 pounds of soda ash and stir until dissolved. Dilute this mixture with cold water to make 15 gallons of solution, then add 5 pounds of Pels caustic soda beads. Stir to dissolve and allow to stand. When diluted 1 to 10 with water, this solution is an excellent cleaner and sanitizer for [illegible]

Filter Pulp:

[illegible]

Fermenting Tubs—Cyprus:

Clean and [illegible] to remove all traces of [illegible] 500 ppm as a [illegible] solution. Allow to stand 10 - 12 hours. Rinse with potable water before use.

False Bottoms:

Sanitize false bottoms by covering them with warm water and brewer's yeast and one [illegible] calcium hypochlorite for every 4 gallons of water used. Allow to stand 20 minutes

Washing Equipment:

[illegible]

Malting Areas

[illegible]

Aging Cellars

[illegible]

Pasteurizers:

Slime and odors that develop in [illegible] pasteurizers can be controlled with regular use of a 1% available chlorine solution fed into the pasteurizer water supply by a hypochlorinator. A feed rate which provides a dosage of 0.5 to 1.0 ppm available chlorine at the overflow is required for optimum results. After draining and cleaning pasteurizers, the hypochlorinator should be used to provide fresh refill water with the proper chlorine residual.

Grain Steep Tanks:

Calcium hypochlorite is highly effective in controlling mold growth in humid malt house conditions. Steep tanks should be washed lightly with water first, then sprayed with a 1.5 to 2.0% available chlorine solution. After a 30 minute contact time, spray the tanks with high pressure potable water.

The walls of concrete germination compartments should also be washed lightly and treated as above.

The perforated metal floors of germination compartments should be sprayed with high pressure water and then covered at a rate of 0.15 oz. of dry calcium hypochlorite per square foot of [illegible] A clean, dry or contaminated [illegible] or pre-aging device may be used effectively. Allow the coating to stand for [illegible] minutes, then wash away thoroughly with high pressure [illegible] water.

Water Supplies.

Calcium hypochlorite solutions containing 1% available chlorine will properly sanitize piped water used in the production of beer.

The calcium hypochlorite solution [illegible] the [illegible] water [illegible] Allowed [illegible] to 1 to 0.2 ppm [illegible] to destroy [illegible] water [illegible]

FOOD PROCE

BEST DOCUMENT AVAILABLE

Carbonated Beverage Plants

Water Supplies:

Available plant water supplies used in the production of carbonated beverages may be properly sanitized by introducing a solution of 1 [illegible] available chlorine. The solution should be introduced by a hypochlorinator and adjusted to supply an available chlorine residual of 0.1 to 0.2 ppm at all times.

Be sure to dechlorinate the water before it is used to process beverages.

Manufacturing Equipment:

The use of calcium hypochlorite is a reliable and economical way to sanitize equipment and control the quality and taste of carbonated beverages.

Before bottling operations start up feed a 300 ppm available chlorine solution through all pumps, lines and [illegible] to eliminate bacteria. Rinse with potable water before [illegible]. After [illegible] bottling operation [illegible] Syrup tanks [illegible] minute [illegible] potable water.

Cider Plants

[illegible]

Wineries

Plant Sanitization

[illegible]

[illegible] hypochlorite [illegible] ppm available chlorine. Let [illegible] minute [illegible] contact with the water.

Potable surfaces [illegible] with a 100 ppm available chlorine solution. Let stand [illegible] contact with the surface [illegible] water.

Storage vessels for [illegible] casks, presses [illegible]

[illegible] with a [illegible] calcium hypochlorite [illegible] ground [illegible] heavy growth [illegible] not be [illegible] potable water.

Storage and Filling Tanks:

Disinfect storage and filling tanks with calcium hypochlorite to maintain a high level of product quality.

After [illegible] filling tanks [illegible] sanitized with calcium hypochlorite. Wooden tanks [illegible] containing 500 ppm [illegible] the tanks [illegible]

Press Cloth

Grape Juice Plants

Mold Control

Egg Breaking Operatior

Calcium hypochlorite solutions control bacteria on contaminated and sanitize equipment and areas in egg breaking operations.

Food Egg Product Sanitization:

Thoroughly clean all eggs. Prep 200 ppm available chlorine solut using warm water. (Temperature should not exceed 130 degree F.) Spray the warm sanitizer over egg [illegible] that they are thoroughly wetted. A[illegible] the eggs to dry before casing or b[illegible]ing. Do not apply a potable water. The solution should not be reusc [illegible] sanitize eggs.

Cutting breaking knives, trays an other equipment that comes in c[illegible] with egg should be thorous[illegible] cleaned and sanitized. Clean all [illegible] with washing powder and r[illegible] with water immediately pr[illegible] breaking back [illegible] spray with a [illegible] containing [illegible] available chlorine [illegible] FDA guidelines.

Egg breaking [illegible] all eq[illegible] should be de[illegible] and sanitized with solut[illegible] After cl[illegible] spray we[illegible] and fl[illegible] available c[illegible] and dra[illegible]

FOOD PROCESSING PLANTS:

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...e affected surfaces with a
...ypochlorite solution prepared
...available chlorine. Heavy
...ay require scrubbing and/or
...applications.

...and Filling Tanks:

...et storage and filling tanks
...um hypochlorite to maintain a
... of product quality.
...run and before refilling tanks,
...uld be thoroughly sanitized
...um hypochlorite. Wooden
...uld be filled with calcium
...rite solutions containing 500
...lable chlorine. Solutions
...tand for an hour and the tanks
...th potable water before
...g.

...porous tanks should be filled
...lcium hypochlorite solutions
...ning 250 ppm available chlo-
...et stand 15 minutes, then flush
...sed tanks and vats should be
...sanitized with calcium hypo-
...rite. Fill each with water and
...dry calcium hypochlorite to
...

Press Cloths

...

...e Juice Plants

...

Egg Breaking Operations:

Calcium hypochlorite solutions will control bacteria on tanning tubs, and sanitize equipment and areas used in egg breaking operations.

Food Egg Product Sanitization:

Thoroughly clean the eggs. Prepare a 200 ppm available chlorine solution using warm water (rinsing temperature should not exceed 130 degrees F). Spray the warm sanitizer over eggs so that they are thoroughly wetted. Allow the eggs to dry before cracking or breaking. Do not apply potable water rinse. The solution should not be reused to sanitize eggs.

Egg breaking knives, trays, and any other equipment that comes in contact with the eggs should be thoroughly cleaned and sanitized. Clean the equipment with warm water and a detergent rinse. ...

Spray on for all surfaces to be wet thoroughly. Allow excess solution to drain off, then place in service.

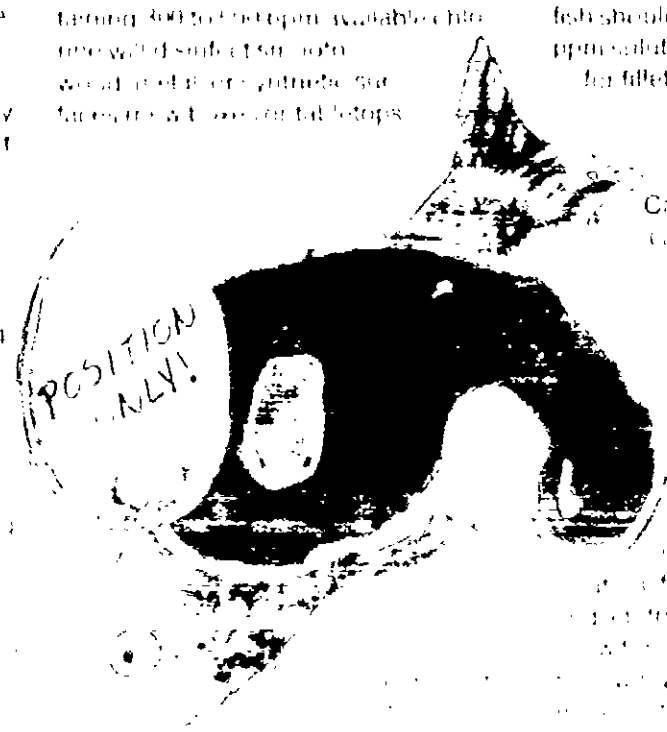
Fish Processing Plants

Calcium hypochlorite solutions will control the growth of bacteria and microorganisms which occur in fish processing plants.

Scrub all surfaces thoroughly with hot water and washing powder to remove any physical soil before treatment.

Hard or Nonporous Surfaces:

Calcium hypochlorite solutions containing 500 to 200 ppm available chlorine will sanitize surfaces such as metal, glass, plastic, ceramic tile, formica and tabletops.



Soft or Porous Surfaces

Fish Filleting.

Calcium hypochlorite solutions will control the growth of slime on fish and prevent increased bacterial count during filleting and packaging.

Place eviscerated and degilled fish removed from the fishing vessel in a wash tank of seawater or fresh water which has been treated with enough product to produce a chlorine residual of 25 ppm, as determined by a test kit. Remove fish from treated water and refrigerate at 37 degrees F for 24 to 48 hours before filleting. After scaling, the fish should again be washed in a 25 ppm solution. The fish are then ready for filleting and packaging.

Pecan Cracking and Bleaching

Calcium hypochlorite solutions can be used both to control bacteria on pecans and also to bleach the shell in preparation for dyeing. ...

Sugar Refineries

[illegible]

Dust Collector Bacteria:

[illegible]

General Sanitization

[illegible]

Sugar Bags

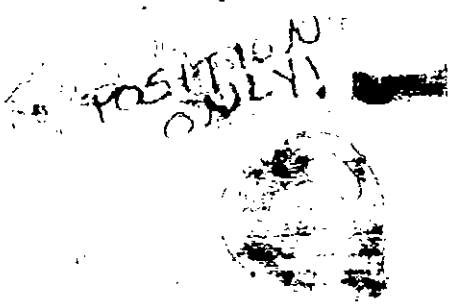
[illegible]

Gum-Forming Bacteria

[illegible]

Thermophilic Bacteria in Vacuum Pans

[illegible]



Beet Sugar Plant

[illegible]

Canneries

[illegible]

Test the cooling water for avai chlorine. If a residual of 2 ppm is sent throughout the system, the is properly sanitized.

Test for available chlorine ever until dosage requirements are es lished. Thereafter, check every 2 hours to ascertain that an availat chlorine residual of 2 ppm is ma tained throughout the cooling sy

Water Supplies:

One percent chlorine solution effectively purify the water supp canneries. Feed the solution inte water supply by a hypochlorinat the intake side of the pump. An able chlorine residual of 0.1 to 0. must be maintained throughout water distribution system to ass adequate purification. Regular te should be initiated to assure prop chlorine residuals are present at tim

Wastes:

[illegible]

...uous treatment may be ...shed by a hypochlorinator ...tion should be applied to the ...ater as soon as it leaves the ...ter a 10 minute contact period ...waste should show a residual of ...ppm

...treatment of beet sugar waste ...at will ... the ... apply a ... hypochlorite solution to pro... ...sidual of 10 to 15 ppm for at ...minutes every 4 to 5 days. This ...ent flume contamination.

...heries

...reshly-packed cans are ... by immersion in cold water ...tes a partial vacuum in the ... which may allow the cooling ... enter through seams or pin ... bacteria are present in the ...ents may become contami... ...spo...

...um hypochlorite ... ...available ... ...

...

Test the cooling water for available chlorine. If a residual of 2 ppm is present throughout the system, the water is properly sanitized.

Test for available chlorine every hour until dosage requirements are established. Thereafter, check every 2 or 3 hours to be certain that an available chlorine residual of 2 ppm is maintained throughout the cooling system.

Water Supplies:

One percent chlorine solutions will effectively purify the water supply in canneries. Feed the solution into the water supply by a hypochlorinator on the suction side of the pump. An available chlorine residual of 0.1 to 0.2 ppm must be maintained throughout the water distribution system to assure ... ...

Wastes:

...

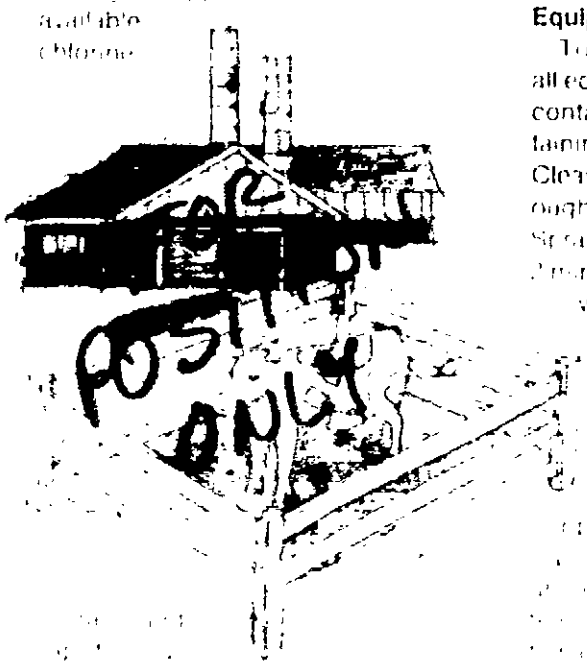
Meat Processing Plants

An effective general sanitizer, calcium hypochlorite solutions also provide odor control in meat processing plants.

Killing Rooms:

Disinfect the entire killing room with calcium hypochlorite solution to prevent the contamination of meat and the development of offensive odors.

Scrub all walls and floors completely. Spray thoroughly with a solution containing 5000 ppm available chlorine.



Inedible Rooms:

...

Edible Rooms:

Calcium hypochlorite solutions containing 1000 ppm available chlorine will control bacteria in refrigerating, curing, and processing areas to prevent taste and color problems in products.

Thoroughly clean all edible rooms on a regular basis. After cleaning, room surfaces and equipment should be sprayed well with solution. After spraying, let stand 5 minutes, then rinse all metal equipment thoroughly with water.

Equipment and Utensils:

To prevent contamination, sanitize all equipment and utensils that come in contact with meat with a solution containing 200 ppm available chlorine. Clean equipment and utensils thoroughly, removing all fat and grease. Spray or rinse with solution. Let stand 2 minutes, then rinse all metal surfaces with potable water.

Locker Rooms, Elevator Pits, and Toilets.

Sanitize and deodorize ... locker rooms, elevator pits, and toilets with a calcium hypochlorite solution containing ... available chlorine. ... After ...

INSTITUTION
HOME SANIT

Dairy Industries

Creameries, Ice Cream Factories, Cheese Factories, and Milk Plants

Calcium hypochlorite solutions provide an effective economical method of sanitizing processing equipment and problem areas in creameries ice cream factories cheese factories and milk plants

To prevent contamination of the product apply calcium hypochlorite solutions to every surface that will touch

Pressure Sanitizing Equipment:

Pressure is commonly used to sanitize closed systems such as fluid milk cooling and handling equipment The pressure method is also appropriate for sanitizing weigh tanks coolers short time pasteurizers pumps homogenizers filters sanitary piping and fittings and bottle and can fillers

Immediately after use clean all equipment thoroughly then place in operating position

[illegible]

Spray Sanitizing Equipment

[illegible]

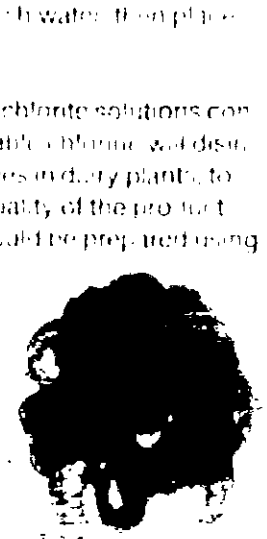
[illegible] completely and rinse thoroughly with fresh water immediately following treatment

Heavily spray or fog all surfaces the product will contact All surfaces corners and fittings should be thoroughly coated Allow excess solution to drain off rinse with fresh water then place in service

Water Supplies:

Calcium hypochlorite solutions containing [illegible] available chlorine will disinfect water supplies in dairy plants to safeguard the quality of the product The solution should be prepared using the following

[illegible]



POSITION ONLY!

General Sanitizing:

Sanitize plant floors walls and ceilings [illegible] controlled temperature refrigerated areas [illegible] with a 1000 ppm calcium hypochlorite solution

Flush or wash surfaces generously with solution After 2 minutes rinse all metal surfaces with fresh water

Controlling Mold and Mildew:

Destroy mold and nonresidual mildew that often grows in cheese aging rooms storage rooms and other areas with a calcium hypochlorite solution of 5000 ppm available chlorine

Brush or spray all walls floors ceilings and shelves with the solution Then rinse all metal surfaces immediately to prevent corrosion

Wastes:

Calcium hypochlorite solutions containing 15 to 25 ppm available chlorine provide disinfection and odor control of dairy plant wastes

[illegible] basin [illegible]

Sanitizing Nonporous F
Contact Surfaces:

Rinse Method:

A calcium hypochlorite solutio 100 ppm available chlorine may used in the sanitizing solution if a rine test kit is available Solutions taining an initial concentration o ppm available chlorine must be t and adjusted periodically to insu the available chlorine does not fa below 50 ppm If a test kit is not av able, prepare a sanitizing solutio provide approximately 200 ppm a able chlorine by weight.

Remove physical soil from equ ment surfaces in potable water. P to use, rinse surfaces thoroughly the sanitizing solution, maintain contact with the sanitizer for at le minutes If solution contains less 50 ppm available chlorine, as dete mined by a suitable test kit, eitho discard or add sufficient dry calc hypochlorite to re-establish a 200 ppm residual Do not rinse equipment with water after treatment and do not soak equipment overnight Sanitizer used in automated sys may be used for general cleanin may not be used for sanitizing [illegible]

INSTITUTIONAL, COMMERCIAL, AND HOME SANITIZATION AND DISINFECTION

a: Sanitizing:

t e plant floors, walls and ceil-
s control odors in refrigerated
p d on drain platforms with a 1000
a cium hypochlorite solution
b r swab surfaces generously
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ng Mold and Mildew:

y mold and nonresidual mil-
e often grows in cheese-aging
torage rooms, and other areas
alcium hypochlorite solution of
n available chlorine
or spray all walls, floors ceil-
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prevent corrosion

m hypochlorite solutions con
5 to 25 ppm available chlorine
disinfection and odor control of
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erflow-type retention basin
outfall of sufficient length is
cessary to provide required
ntact time and mixing For
ntinuous treatment calcium
ypochlorite solution
ypochlorinator capacity of

Sanitizing Nonporous Food Contact Surfaces:

Rinse Method:

A calcium hypochlorite solution of 100 ppm available chlorine may be used in the sanitizing solution if a chlorine test kit is available Solutions containing an initial concentration of 100 ppm available chlorine must be tested and adjusted periodically to insure that the available chlorine does not fall below 50 ppm If a test kit is not available prepare a sanitizing solution to provide approximately 200 ppm available chlorine by weight

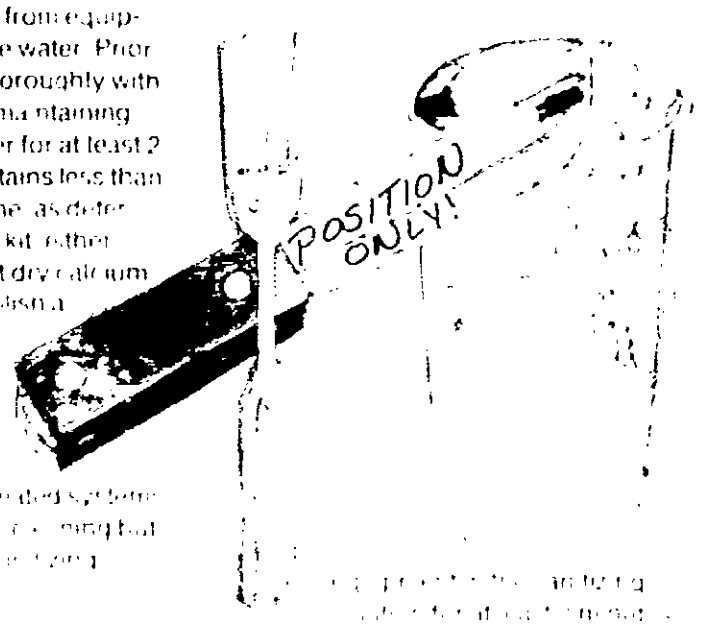
Remove physical soil from equipment surfaces in potable water Prior to use, rinse surfaces thoroughly with the sanitizing solution maintaining contact with the sanitizer for at least 2 minutes If solution contains less than 50 ppm available chlorine as determined by a suitable test kit either discard or add sufficient dry calcium hypochlorite to restore sanitizing

residual Do

Immersion Method:

A calcium hypochlorite solution of 100 ppm available chlorine may be used in the sanitizing solution if a chlorine test kit is available Solutions containing an initial concentration of 100 ppm available chlorine must be tested and adjusted periodically to insure that the available chlorine does not fall below 50 ppm If a test kit is available prepare a sanitizing solution to provide approximately 200 ppm available chlorine by weight

Remove physical soil from equipment surfaces in potable water Prior to use immerse



Flow/Pressure Method:

Disassemble equipment and thoroughly clean after use Assemble equipment in operating position prior to use Prepare a volume of a 200 ppm available chlorine sanitizing solution equal to 110% of volume capacity of the equipment Pump solution through the system until a full flow is obtained in all extremities and the system is completely filled with the sanitizer Close drain valves and hold under pressure for at least 2 minutes to insure contact with all internal surfaces Remove some solution from drain valve and test with a chlorine test kit If effluent contains less than 50 ppm available chlorine repeat the process Rinse the system with potable water prior to use

Clean-In-Place Method:

Thoroughly clean the equipment after use Prepare a volume of a 200 ppm available chlorine sanitizing solution equal to 110% of volume capacity of the equipment Pump the solution through the system until full flow is obtained at all extremities and the system is completely filled with air and filled with the sanitizer Close drain valves and hold under pressure for at least 10 minutes to insure contact with all internal surfaces Remove some solution from drain valve and test with a chlorine test kit If effluent contains less than 50 ppm available chlorine repeat the process Rinse the system with potable water prior to use

Spray/Fog Method:

Thoroughly clean all surfaces after use. Prepare a 200 ppm available chlorine solution to control bacteriophage. Use spray or fogging equipment which resists hypochlorite solutions. Thoroughly spray or fog all surfaces until wet, allowing excess sanitizer to drain. Vacate area for at least 2 hours. Prior to using equipment, rinse all surfaces treated with a 600 ppm solution with a 200 ppm solution. Empty and rinse spray/fog equipment with potable water.

Sanitizing Porous Food Contact Surfaces

Rinse Method:

Prepare a solution of approximately 600 ppm available chlorine by weight. Preclean surfaces in the normal manner and immediately rinse all surfaces thoroughly with the sanitizing solution, maintaining contact with the sanitizer for at least 2 minutes. Rinse equipment with potable water after treatment.

Immersion Method:

[illegible]

Spray/Fog Method:

[illegible]

Sanitizing Nonporous Non-Food Contact Surfaces

Rinse Method:

Clean equipment surfaces in the normal manner. Immediately rinse all surfaces thoroughly with a 200 ppm available chlorine solution, maintaining contact for at least 2 minutes. Do not rinse after treatment and do not soak equipment overnight.

Immersion Method:

Clean the equipment in normal manner. Immediately immerse in a 200 ppm available chlorine solution for at least 2 minutes and allow the sanitizer to drain. Do not rinse after treatment.

Spray/Fog Method:

Preclean all surfaces after use. Prepare a 200 ppm available chlorine solution. Use spray or fogging equipment which can resist hypochlorite solutions. Immediately spray or fog all surfaces thoroughly, then allow excess solution to drain. Vacate area for at least 2 hours.

Sanitizing Porous Non-Food Contact Surfaces

Rinse Method:

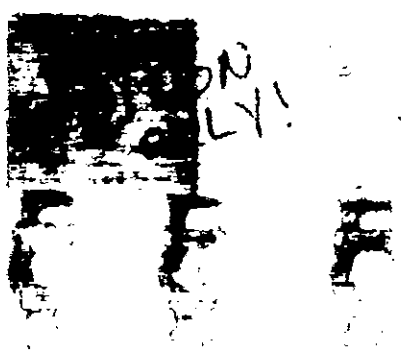
Prepare a sanitizing solution of approximately 600 ppm available chlorine by weight. Clean the surfaces in a normal manner. Prior to use, rinse all surfaces thoroughly with the sanitizing solution, maintaining contact with the sanitizer for at least 2 minutes. Do not rinse equipment after treatment. Do not soak equipment overnight.

Immersion Method:

Prepare a sanitizing solution of approximately 600 ppm available chlorine by weight. Clean the equipment in a normal manner. Prior to use, immerse the equipment in the sanitizing solution for at least 2 minutes and allow the sanitizer to drain. Do not rinse equipment after treatment.

Spray/Fog Method:

After [illegible] on food [illegible] solution containing [illegible] chlorine. Use [illegible] which [illegible]. Prior to [illegible] thoroughly spray [illegible] drain [illegible]. Rinse [illegible]



Disinfecting Nonpor Non-Food Contact S

Rinse Method:

Prepare a disinfecting solu approximately 600 ppm avai rine by weight. Clean equipn faces in a normal manner. In prior to use, rinse all surface oughly with the disinfecting maintaining contact with the for at least 10 minutes. Do n after treatment. Do not soak overnight.

Immersion Method:

Prepare a disinfecting solu of approximately 600 ppm a able chlorine by weight. Cle the equipment in a normal manner. Immediately, prior use, immerse the equipment disinfecting solution for at le minutes and allow the saniti solution to drain. Do not rins equipment after treatment.

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Disinfecting Nonporous Non-Food Contact Surfaces

Rinse Method:

Prepare a disinfecting solution of approximately 600 ppm available chlorine by weight. Clean equipment surfaces in a normal manner. Immediately prior to use, rinse all surfaces thoroughly with the disinfecting solution, maintaining contact with the solution for at least 10 minutes. Do not rinse after treatment. Do not soak equipment overnight.

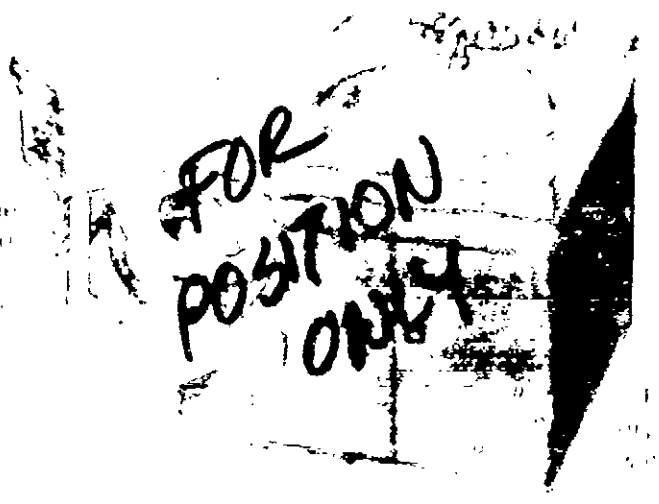
Immersion Method:

Prepare a disinfecting solution of approximately 600 ppm available chlorine by weight. Clean the equipment in a normal manner. Immediately prior to use, immerse the equipment in the disinfecting solution for at least 10 minutes and allow the sanitizer solution to drain. Do not rinse the equipment after treatment.

General Disinfection

Calcium hypochlorite solutions of 1000 ppm available chlorine will sanitize floors, walls, and ceilings, and control odors in refrigerated areas and on drain platforms.

Flush or swab surfaces thoroughly with the solution. Let stand 2 minutes, hose or rinse all metal surfaces with potable water.



Controlling Mold or Mildew

Calcium hypochlorite solutions containing 5000 ppm available chlorine will destroy mold and nonresidual mildew that grow in storage rooms and other areas.

Brush or spray walls, floors, ceilings, and shelves with the solution. Rinse all metal surfaces immediately to prevent corrosion.

Bathrooms

Calcium hypochlorite solutions containing 5000 ppm available chlorine will sanitize and deodorize toilets, shower rooms, urinals, drains and other bathroom facilities.

Toilets, shower rooms, urinals, and drains should be cleaned and sprayed or flushed with the calcium hypochlorite solution on a regular basis. After treatment, let stand 10 minutes and rinse exposed metal surfaces with potable water to prevent corrosion.

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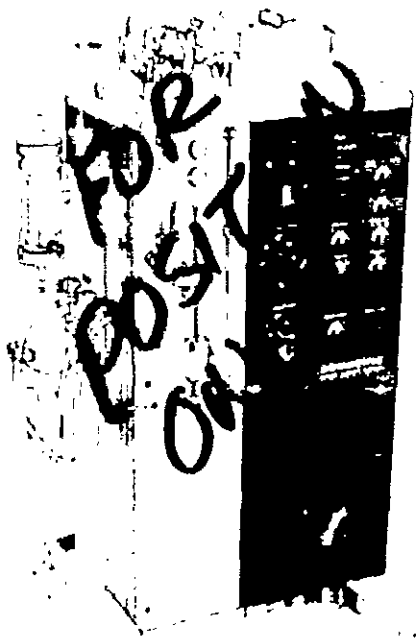
PREPARIN
CALCIUM
SOLUTION

Sanitizing Dialysis Machines

Flush dialysis equipment thoroughly with water prior to sanitizing. Thoroughly dissolve 7 oz. of this product in 60 gallons of water to obtain at least a 600 ppm available chlorine solution. Use this solution in the hemodialysate system immediately allowing a minimum contact time of 15 minutes at 20 degrees C. Thereafter drain the system of the sanitizing solution and thoroughly rinse with potable water. Discard and **do not** reuse the sanitizer. Rinsate must be monitored with a suitable test kit to insure that no available chlorine remains in the system.

Calcium hypochlorite solutions are recommended for decontamination of single and multipatient hemodialysis systems. Calcium hypochlorite has been shown to be an effective biocide infectant (including fungicidal, tuberculocidal, pseudomonacidal, virucidal, AOAC and EPA [illegible]) [illegible] not [illegible]



Asphalt or Wood Roofs and Sidings

To control fungi and mildew, first remove all physical soil by brushing and hosing with clean water. Then apply a 600 ppm available chlorine solution. Mix 1 oz. of this product per gallon of water and brush or spray roof or siding. After 30 minutes standing time rinse by hosing with clean water.

SERVICE

[illegible] staff of PG [illegible] available for consultation [illegible] use of [illegible] sanitizing [illegible]

Each of the applications d
this brochure requires a sp
centration of solution mea
parts per million (ppm) or p
ble chlorine. To prepare th
strength solution, follow th
directions

1. Use a clean, **non-meta**
free of grease, oil or resi

CALCIUM HYPOCHLORI

Dry Weight
6 ounce
2 ounce
1 ounce
8 ounces

[illegible] measure

The following table indicate
amount of calcium hypoch
to make various quantit

Available Chlorine (ppm)*	Weight 1 gall lbs.
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
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[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

PREPARING CALCIUM HYPOCHLORITE SOLUTIONS

Each of the applications described in this brochure requires a specific concentration of solution measured in parts per million (ppm) or percent available chlorine. To prepare the proper strength solution, follow these simple directions:

1. Use a clean, **non-metallic** container free of grease, oil or residue.
2. Add granular calcium hypochlorite to lukewarm water.
3. Stir for three to five minutes.
4. Use immediately.

NOTE: As a safety precaution, prepare only the amount of solution needed. Never store a calcium hypochlorite solution.

CALCIUM HYPOCHLORITE MEASUREMENT EQUIVALENTS

Dry Weight	Household Measurement*
1/6 ounce	1 level teaspoon
1/2 ounce	1 level tablespoon
1 ounce	2 level tablespoons
8 ounces	16 level tablespoons (1 cup)

*These household measurements are only approximate. Use a scale or weight for more accurate measurement.

The following table indicates the amount of calcium hypochlorite required to make various quantities of solution containing from 5 to 100 ppm available chlorine.

Available Chlorine (ppm)*	Weight of Calcium Hypochlorite Required to Make Solution							
	1 gallon		10 gallons		50 gallons		100 gallons	
	lbs	oz	lbs.	oz.	lbs	oz.	lbs.	oz.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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(713) 444-5720
Eric A. Smith

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Dennis R. Hamilton

Edgewood, Kentucky 41017
South Bend Plaza
(606) 341-5549
Jeffrey M. Cross

Area and District* Sales Offices

Charlotte, North Carolina 28210
[illegible]

Chicago (Rosemont), Illinois 60018
[illegible]

***St. Louis, Missouri 63105**
[illegible]

Cleveland, Ohio 44130
[illegible]

***Cincinnati, Ohio 45246**
[illegible]

New York (West Orange, New Jersey) 07052
[illegible] Main Street
New York (212) 952-8454
New Jersey (201) 789-9400

Philadelphia (Haddonfield, New Jersey) 08033
[illegible] Avenue
[illegible]

San Francisco (Burlingame), California 94010
[illegible] Boulevard, Suite 518
(415) [illegible]

***Los Angeles (Whittier), California 90603**
[illegible]

Houston, Texas 77069
[illegible]

PPG Chemical Toll Free:
1 + 800 + CHEM PPG

[illegible] DOCUMENT [illegible] AVAILABLE

PPG [illegible]

RESERVOIRS

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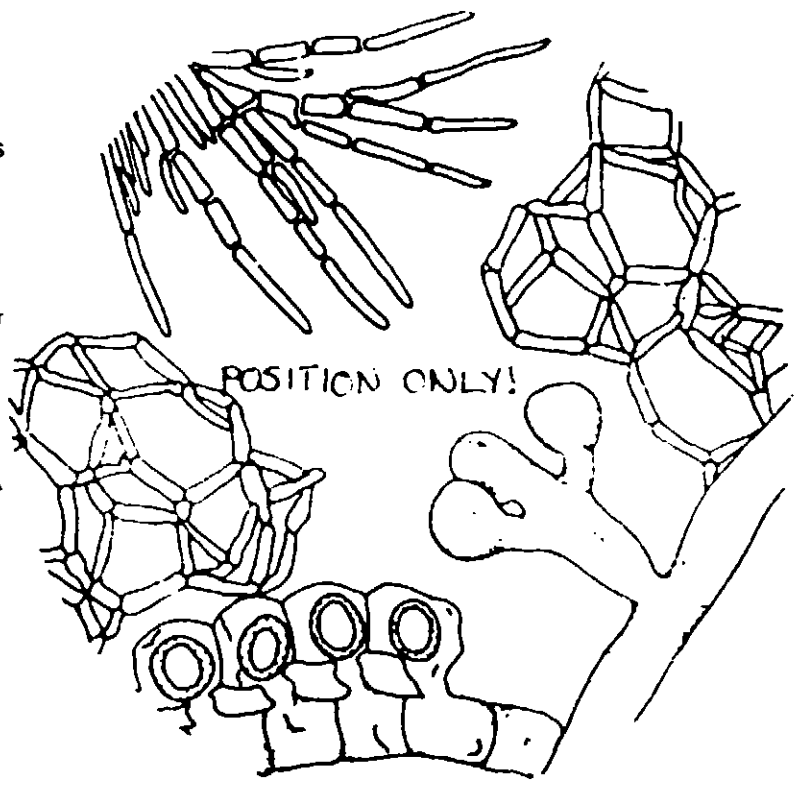
Bacteria control

Contamination of reservoirs is an ever-present possibility. Most frequently, it is caused by careless persons or seepage from ground contamination. In order to keep reservoir water bacteriologically acceptable, it is necessary to test regularly and chlorinate sufficiently to maintain a residual of 0.2 ppm free available chlorine. This is equivalent to 1.2 ounce of calcium hypochlorite per 30,000 gallons of water **after** chlorine demand has been satisfied.

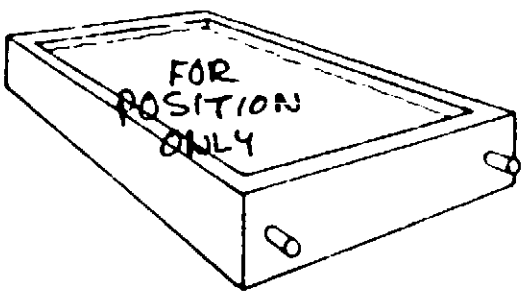
Where contamination is caused by overflowing streams, establish hypochlorinating stations upstream of the reservoir. Chlorinate the inlet water until the entire reservoir attains a 0.2 ppm available chlorine residual as determined by a chlorine test kit. Where contamination is from surface drainage, apply sufficient calcium hypochlorite directly to the reservoir to attain a 0.2 ppm available chlorine residual in all parts of the reservoir.

Daily testing should be accomplished **away** from the water inlet. If samples must be taken near the inlet, allow them to stand at least 20 minutes before testing. Experiment to find that chlorine demand will be higher during periods of heavy rainfall and extreme dryness or heat.



Continuous feeding of calcium hypochlorite at a water pump source is usually the most effective means of maintaining an adequate chlorine residual.

When [illegible] granular calcium hypochlorite [illegible] face water [illegible] all parts of the reservoir at the equal amounts of the product so that distribution is complete and [illegible] throughout.



Algae control

Rapid algae growth in reservoirs is an indication of increased chlorine demand. When algae become a problem, special action is necessary. There are several methods of treatment. One of the [illegible] is to hypochlorinate streams [illegible] the reservoir [illegible] suitable [illegible] should be selected on each stream [illegible] yards upstream from the point of entry into the reservoir.

Continous chlorination is usually effective in destroying algae where a sufficient amount of sanitizer is fed to produce a chlorine residual of 0.2 to 0.5 ppm free available chlorine. Where continuous feeding is not possible,

WATER MAINS

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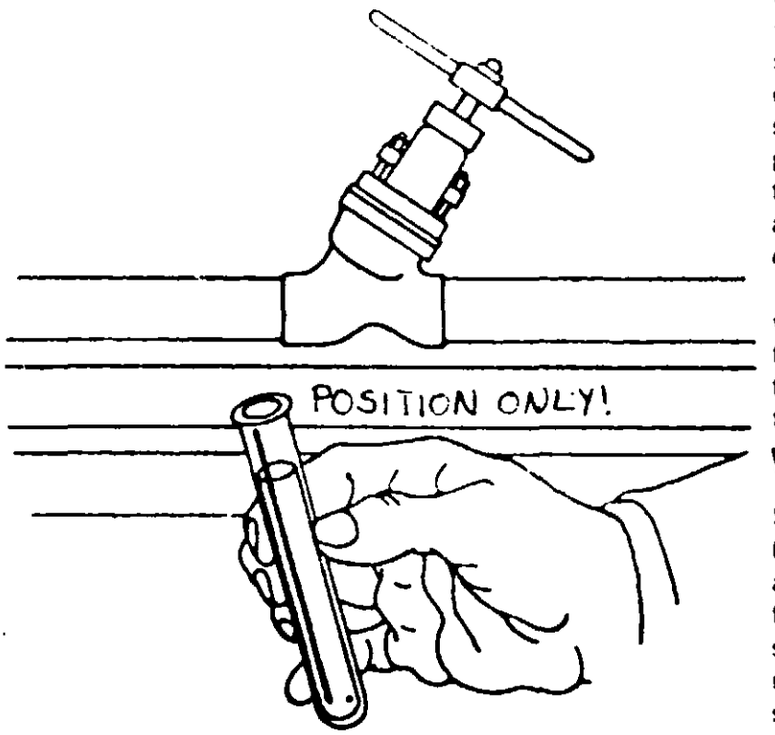
scheduled [illegible] ing should be [illegible] doing so, broad[illegible] hypochlorite over the surface of the reservoir evenly, taking special care to treat shallows and edges. As it descends, the product dissolves, distributing a chlorinating action to all depths.

Introduce a sufficient amount of calcium hypochlorite to provide a residual of from 0.2 to 1.5 ppm for up to 24 hours.



New and newly cleaned reservoirs

New or recently cleaned reservoirs must be completely disinfected with calcium hypochlorite before use. Spray all parts and surfaces with a 0.5%—5000 ppm solution. (1 ounce calcium hypochlorite to 1 gallon of water.) When the reservoir is filled, chlorinate as described above. Note: **As a safety precaution, do not store calcium hypochlorite solution. When mixed, use immediately.**

Newly installed water mains or those which have been repaired must be disinfected before being put into service as they are contaminated by construction conditions. Completely flush the section to be sanitized. Allow a water flow of 2.5 feet or more per second to continue under pressure while introducing a 1% available chlorine solution with a hypochlorinator. Continue injecting this solution until a 50 ppm free available chlorine reading is obtained at the distant end of the new section after a 24-hour retention period. Afterward, flush the heavily chlorinated water free of the system. (Refer to page 17 for preparation of the 1% solution.)

Forty-eight hours after the initial treatment, test the water supply again for bacteria and chemicals. If results are unsatisfactory, maintain a 0.4 ppm free chlorine residual in the main until test samples are acceptable for two successive days.

Note: Keep out trench water and other contaminates from new mains by capping the pipe ends before lowering them into place.

WELLS

Municipal authorities often help the residents of rural areas, particularly dairy farmers, safeguard their water supplies as any disease originating there could easily spread throughout the community.

Since the contamination of well water, even from deep wells, is always possible, it too should be chlorinated. The most effective method of doing so is to feed calcium hypochlorite into the intake line of the pump. This also helps keep the filter free of slime. Automatic hypochlorination equipment for this purpose is readily available and easy to use.

If it is not possible to locate a feed at the intake line, feed calcium hypochlorite anywhere in the pump discharge line. Feed sufficient calcium hypochlo-

8 of 34

745-239

WELLS

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rite to produce a free chlorine residual of at least 0.2 ppm and no more than 0.6 ppm after a 20-minute contact period

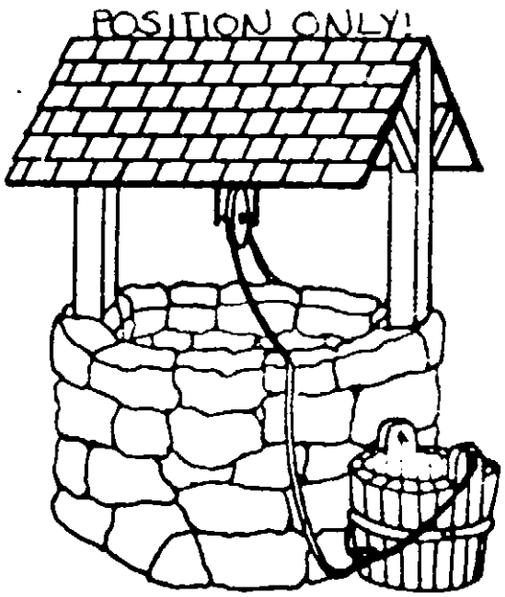
Regular testing is necessary and a record of test readings should be kept

New wells **must** be treated

Public wells

Before using, flush the casing with a 50 ppm available chlorine solution (1 ounce of calcium hypochlorite for each 100 gallons of water). The solution should be pumped or fed by gravity into the well and thoroughly mixed and agitated. The well should stand overnight or for twelve hours under chlorination. It may then be pumped until bacterial examination of a representative raw water sample will indicate whether further treatment is necessary

After the initial treatment, begin feeding a 1% available chlorine solution of this product with a hypochlorinator, as directed above, until a free available chlorine residual of at least 0.2 ppm and no more than 0.6 ppm is attained throughout the distribution system. Check the water frequently with a chlorine test kit. Bacteriological sampling must be conducted at a frequency no less than that prescribed by the National Interim Primary Drinking Water Regulations. Contact your local Health Department for further details



Private wells

Dug Wells—Upon completion of the casing (lining), wash the interior of the casing (lining) with a 100 ppm available chlorine solution using a stiff brush. This solution can be made by thoroughly mixing 1 ounce of this product into 50 gallons of water. After covering the well, pour the sanitizing solution into the well through both the pipe sleeve opening and the pipeline. Also, wash the exterior of the pump cylinder with the sanitizing solution. Start the pump and pump water until a strong odor of chlorine in the water is noted. At this point, stop the pump and allow it to stand at least 24 hours. After 24 hours, flush well until all traces of chlorine have been removed from the water

[illegible] Department [illegible]

Drilled, Driven and Bored Wells—Run the pump until the water is as free from turbidity as possible. Pour a 100 ppm available chlorine sanitizing solution into the well. This solution can be made by thoroughly mixing 1 ounce of this product into 50 gallons of water. Add 5 to 10 gallons of clean, chlorinated water to the well [illegible] the sanitizer into the [illegible] solution. Wash the exterior of the pump cylinder with the sanitizer. Drop the pipeline into the well, start the pump and pump water until a strong odor of chlorine in the water is noted. At this point, stop the pump and wait at least 24 hours. After 24 hours, flush well until all traces of chlorine have been removed from the water. Deep wells with high water levels may necessitate the use of special methods for introduction of the sanitizer into the well. Consult your local Health Department for further details

[illegible] Artesian Wells—Artesian wells generally do not require disinfection. If analyses indicate persistant contamination, the well should be disinfected. Consult your local Health Department for further details

After the initial treatment, follow the practice of maintaining a free chlorine residual of 0.2 ppm to 0.6 ppm in the water outlets after a minimum 20 minute contact period as directed previously.

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TREATMENT PLANTS

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Granular ca[illegible] may be [illegible] in water treatment [illegible] when the system is too small to require gas chlorination equipment or to supplement well or reservoir chlorination.

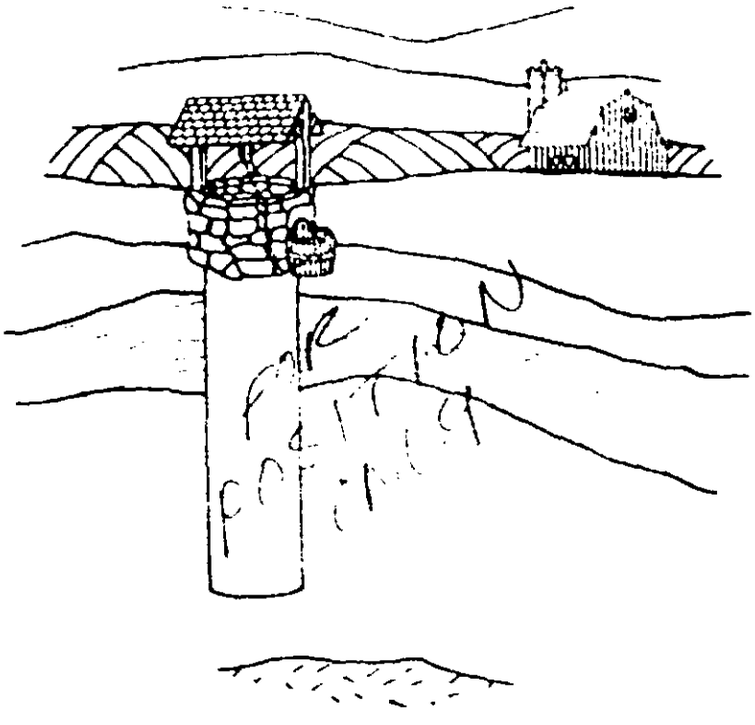
Treatment plants also rely on granular calcium hypochlorite to aid in algae control. As algae may be the source of many objectionable odors, cause mud balls and slime in filter [illegible] and pumps, as well [illegible] pipeline [illegible] through chlorination [illegible] important factor.

The presence of algae is often indicated by a slimy gelatinous film on the inside of pumps, lines, and mixers, etc. It may be eliminated by adding a sufficient quantity of calcium hypochlorite to the forebay or pump well to obtain a 5.0 to 10.0 ppm residual chlorine reading after 20 minutes contact time.

The dosage necessary to provide this reading will vary with conditions, i.e. - hot weather will increase the need for treatment. It [illegible] determined by actual test.

New tanks, basins, etc.

Remove all physical soil from the surfaces. Introduce 4 ounces of calcium hypochlorite for each 5 cubic feet of working capacity (500 ppm available chlorine). Fill to working capacity and allow the solution to stand for at least 4 hours. Drain and flush with potable water and return to service.



New filter sand

Apply 16 ounces of calcium hypochlorite for each 150 to 200 cubic feet of sand. The action of the product dissolving as the water passes through the bed will aid in sanitizing the new sand.

Existing equipment

Remove the equipment from service and thoroughly clean all physical soil from surfaces. Sanitize by introducing 4 ounces of this product for each 5 cubic feet of capacity (approximately 500 ppm available chlorine). Fill to working capacity and let the solution stand at least 4 hours. Drain and place [illegible] and a solution containing 1 ounce of this product for each 5 gallons of water (approximately 1000 ppm available chlorine). After drying, flush with water and return to service.

Cooling tower and heat exchange surface

A clogged or fouled system should be mechanically cleaned to remove all physical soil prior to beginning treatment. Initially, treat by adding enough calcium hypochlorite to provide 10 ppm available chlorine (2 ounces per 1000 gallons) as a shock dosage and circulate it thoroughly through the system.

Then, for continuous preventive control of algae and slime growth, with regularly add enough calcium hypochlorite to the recirculation system to maintain a 1.0 ppm free chlorine residual.

Other water condition factors, such as pH, should be controlled as recommended by the equipment manufacturer.

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EMERGENCY DISINFECTION

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Emergency uses

Acts of nature or the failure of man-made equipment may jeopardize a community's water supply at any time. Flood waters may contaminate reservoirs and wells, drought may dry up water supplies, fire or power failures may interrupt the operation of pumping or purification facilities, mains may break and unknown sources can pollute water. [illegible] these emergencies demand prompt action by responsible authorities. Many communities keep standby supplies of calcium hypochlorite ready to meet such problems. It can be stored in closed containers for reasonably long periods without appreciable loss of its effectiveness. When needed, calcium hypochlorite solutions can be quickly prepared to meet many requirements and may be applied to water with feeders or added manually.

During emergencies, calcium hypochlorite may be used to [illegible] water supplies which have been contaminated or to purify new sources of water quickly and dependably.

Wells

Thoroughly flush the contaminated casing with a 500 ppm available chlorine solution. (Mix 1 ounce of the product with 10 gallons of water.) Backwash the well to increase yield and reduce turbidity, adding sufficient chlorinating solution to produce a 15 ppm available chlorine residual, as determined by a chlorine test kit. After the turbidity has been reduced and the casing has been treated, add sufficient chlorinating solution to produce a 50 ppm available chlorine residual. Agitate the well water for several [illegible] represent [illegible] Re-treat the well if water samples are [illegible] unacceptable.

Basins, tanks, flumes, etc.

Thoroughly clean all equipment, then apply 4 ounces of calcium hypochlorite per 5 cubic feet of water to obtain 500 ppm available chlorine as determined by a chlorine test kit. After 24 hours drain, flush, and return to service. If the previous method is not suitable, spray or flush the equipment with a solution containing 1 ounce of this product for each 5 gallons of water (1000 ppm available chlorine). Allow to stand 2 to 4 hours, flush and return to service.

Filters

When sand filters need replacement, apply 16 ounces of calcium hypochlorite for each 150 to 2[illegible] cubic feet of sand. Where the filter is severely contaminated, additional calcium hypochlorite should be distributed over the surface at the rate of 16 ounces per 20 square feet. Water should stand at a depth of 1 foot above the surface of the filter bed for 4 to 24 hours. Where filter beds can be backwashed of mud and silt, apply 16 ounces of calcium hypochlorite per each 50 square feet, allow-

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EMERGENCY DISINFECTION

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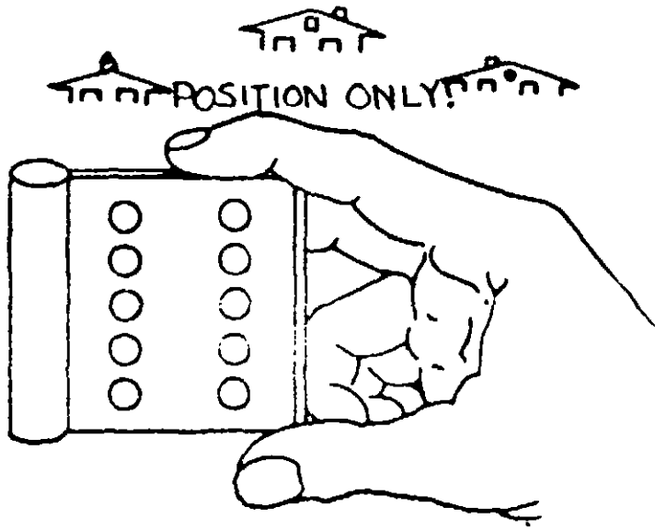
[illegible] the water [illegible] After 30 [illegible] drain the water to the level of the filter. After 4 to 6 hours, drain and proceed with normal backwashing.

Distribution system

Flush the repaired or replaced section with water. Establish a hypochlorination [illegible] sufficient [illegible] consistent [illegible] residual of at [illegible] ppm remains after [illegible] retention time. Use [illegible] chlorine test kit.

Cross connections or emergency connections

Hypochlorination or gravity feed equipment should be set up near the intake of the untreated water supply. Apply sufficient product [illegible] chlorine residual of at least [illegible] 2 ppm at the point where the [illegible] treated supply enters the regular distribution system. Use a chlorine test kit.



Supplementary water supplies

Gravity or mechanical hypochlorite feeders should be set up on a supplementary line to dose the water to a minimum chlorine residual of 0.2 ppm after a 30 minute contact time. Use a chlorine test kit.

Water shipped in by tanks, tank cars, trucks, etc.

Thoroughly clean all containers and equipment. Spray with a 500 ppm avail- [illegible] after [illegible] minutes. [illegible] solution is made by mixing 1 ounce of calcium hypochlorite for each 5 gallons of water. During the filling of the containers, dose with sufficient amounts of this product to provide at least a 0.2 ppm chlorine residual. Use a chlorine test kit.

Individual water supplies

Where boiling of water for 1 minute is not practical, water can be made potable by using calcium hypochlorite. **Prior** to addition of the sanitizer remove all suspended material by filtration or by allowing it to settle to the bottom. Decant the **clarified**, contaminated water to a clean container and add 1 grain of calcium hypochlorite to 1 gallon of water. One grain is approximately the size of the letter "O" in this sentence. Allow the treated water to stand [illegible] 30 minutes [illegible] treated water **should** [illegible] rine odor, do not repeat dosage and allow the water to stand an additional 15 minutes. The treated water can then be made palatable by pouring it between clean containers several times.

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SEWAGE TREATMENT

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B.O.D. reduction

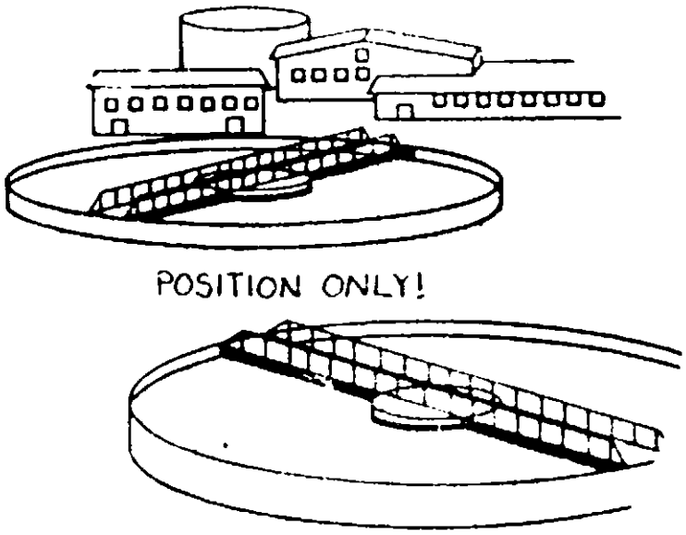
B.O.D., or Biochemical Oxygen Demand, is the quantity of oxygen required to oxidize the polluting substance to a biochemically inert material. As little as 1 part per million of chlorine may bring about a reduction of 2 to 3 ppm in B.O.D. [illegible] results in terms of desirable aerobic action and retardation of anaerobic decomposition hypochlorination should be complete. The treatment will still be of value, however, even if the amount of calcium hypochlorite applied is less than the total amount which could be utilized.

Odor control

The most offensive odor encountered in sewage treatment is [illegible] sewage.

Hydrogen sulfide can be very effectively controlled by calcium hypochlorite hypochlorination of the fresh sewage, which destroys the sulfide-producing bacteria. If the treatment of fresh sewage is not practical, calcium hypochlorite may be added at any point where the odors become objectionable. The amount required will, however, be increased, as the available chlorine in calcium hypochlorite will react not only with hydrogen sulfide, but also with other bacteria and organic material.

For a sulfide reduction of 1 ppm from 8 to 10 ppm of available chlorine probably will be required.



Disinfection of sewage and wastewater effluent

Although every effort is [illegible] made to locate treatment plants where effluent will not be the cause of problems, safe practice dictates that it should be treated to destroy harmful bacteria. Calcium hypochlorite has proven to be [illegible] bacteria [illegible] amount required depends on the type of sewage to be treated. Raw sewage may require as much as 30 ppm available chlorine, while secondary treated sewage may need as little as 3 ppm.

The disinfection of sewage effluent may [illegible] evaluated by determining the total number of [illegible] dure of the treated effluent. This may be reduced to or below the maximum permitted by the controlling regulatory jurisdiction.

On the average, satisfactory disinfection of secondary wastewater effluent can be obtained when the chlorine residual is 0.5 ppm after 15 minutes contact. Although chlorine residual is the critical factor in disinfection, the importance of correlating chlorine residual with bacterial [illegible] the water quality standards [illegible] ments should be the final and primary standard and the chlorine residual should be considered an operating standard valid only to the extent verified by the coliform quality of the effluent.

SEWAGE TREATMENT

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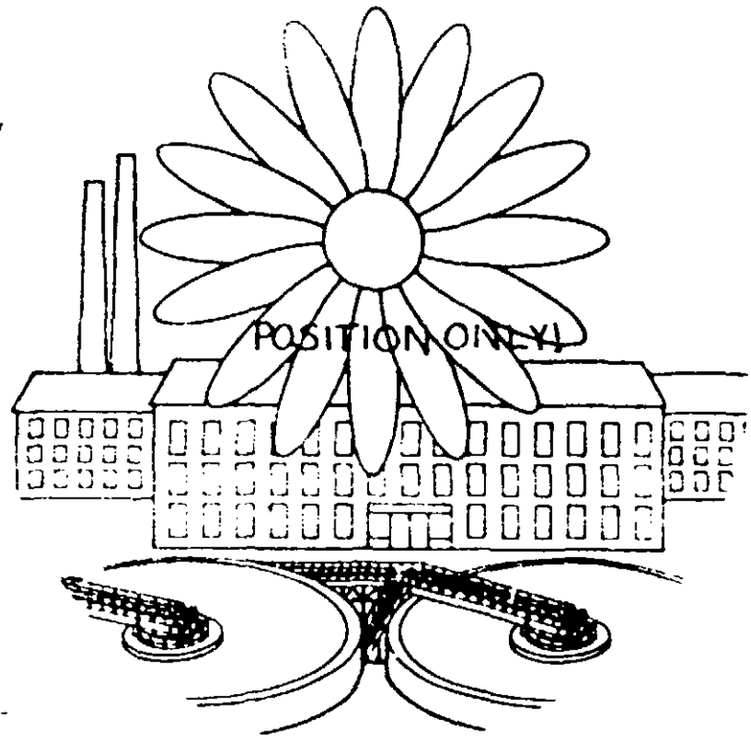
[illegible] disinfection

1 Mixing It is imperative that the product and the wastewater be instantaneously and completely flash mixed to assure reaction with every chemically active soluble and particulate component of the wastewater

2 Contacting: Upon flash mixing, the flow through the system must be maintained

3 Dosage Residual Control Successful disinfection [illegible] extremely dependent [illegible] response to fluctuating [illegible] demand to maintain a predetermined, desirable chlorine level Secondary effluent should contain 0.2 to 1 0 ppm chlorine residual after a 15- to 20-minute contact time A reasonable average of residual chlorine is 0 5 ppm after 15 minutes contact time



Effluent slime control

Apply a 100 to 1000 ppm available chlorine solution at a location which will allow complete [illegible] Prepare the solution by mixing [illegible] calcium hypochlorite with 100 gallons of water Once control is evident, apply a 15 ppm available chlorine solution Prepare this solution by mixing 0 3 ounce of the product with 100 gallons of water

Filter beds—slime control

Remove the filter from service, drain it to a depth of 1 foot above the filter sand, and add 16 ounces of calcium hypochlorite per 20 square feet evenly over the surface Wait 30 minutes before draining water to a level that is even with the top of the filter Wait for 4 to 6 hours before completely draining and backwashing the filter

Aid in coagulation

The value of calcium hypochlorite's available chlorine as an aid in coagulation is due primarily to its oxidizing power—a property which is of particular value in sewage treatment because there is almost no oxygen in sewage

Hypochlorination with calcium hypochlorite is particularly helpful when iron salts are used as the primary coagulant Ferric iron in the absence of oxygen tends to revert to ferrous iron which is of little value as a precipitant Calcium hypochlorite supplies sufficient oxygen to retard or prevent this change It should be used just before the primary coagulant in a proportion of 3 to 5 ppm

CALCIUM HYPOCHLORITE FOR SWIMMING POOLS

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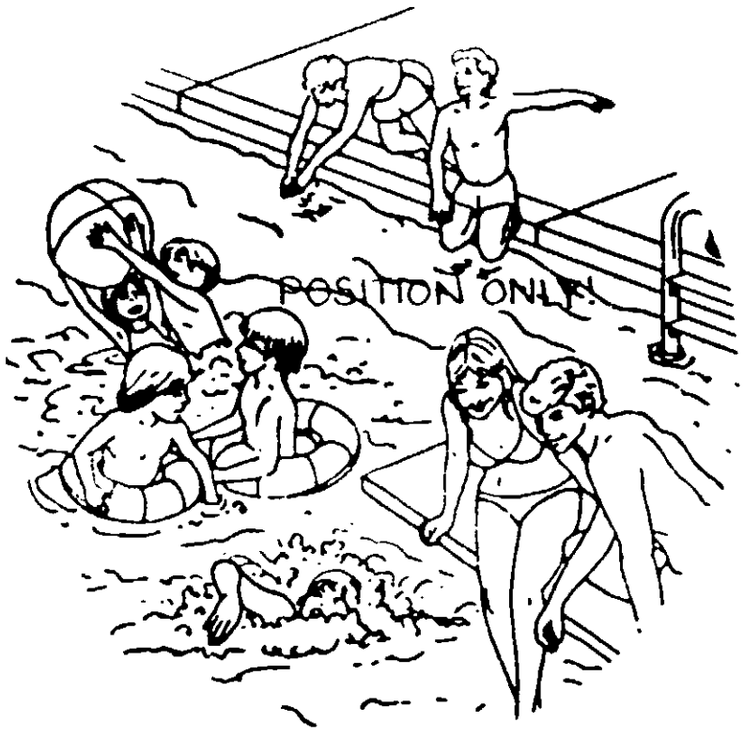
Pool water chlorination

Calcium hypochlorite provides a simple, effective method of treatment for chlorinating swimming pool water. Its use is especially suited to indoor pools. For best results, it is introduced in controlled quantities into the recirculated water. Automatic feed equipment for this purpose is readily available. [illegible] to the PPG Industries booklet "Crystal Water the Pittclor Way", A-1470. This booklet fully describes the uses and application procedures for PPG's Pittclor, swimming pool additives.



Pool accessory equipment

The possibility for the spread of infectious diseases is heightened wherever bathers gather. To provide proper and effective preventive care, calcium hypochlorite should be used to inexpensively destroy harmful bacteria in swimming pool premises and equipment, including shower rooms, floors and walls, rest room facilities, diving boards, ladders, etc.

Note: As this product is toxic to fish and other aquatic life, treated water should not be discharged where it will drain into streams, rivers, lakes, or public waters.

SERVICE

The technical service staff of PPG Industries is available for consultation on handling, storage, and the use of calcium hypochlorite in swimming pool care in general.

PRECAUTIONS AND SAFETY MEASURES

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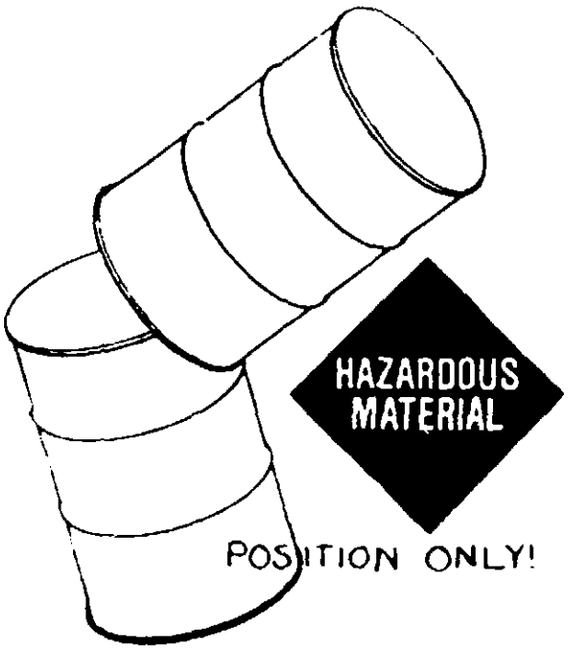
HTH Calcium hypochlorite is a stable chemical when properly stored and handled. However, it is highly corrosive and a strong oxidizing agent. Calcium hypochlorite is not flammable, but in the presence of contaminates or other chemicals it can cause fire or explosion.

Everyone who handles calcium hypochlorite must be completely familiar with proper handling, storage and use procedures, [illegible] and emergency procedures in case of [illegible].

Note: The U.S. Department of Transportation regulates transportation of calcium hypochlorite as "hazardous material". As serious penalties can be imposed for violation of DOT regulations, everyone who transports these products should be informed of these regulations and follow them.



HANDLING AND STORAGE

Before using calcium hypochlorite, read all label directions on the container. All handling and storage directions on the container should be followed [illegible] the chemical.

Do not slide or drop calcium hypochlorite containers. Store the chemical in its original container in a cool, dry place. Be sure the calcium hypochlorite container is tightly closed when not in use. Keep calcium hypochlorite away from heat sources, sparks, open flames, and lighted tabacco products.

In case of fire, drench [illegible] water. Surrounding [illegible] chlorite supplies [illegible] attempts to smother the fire with a wet blanket, carbon dioxide or dry chemical extinguisher are ineffective.

Avoid getting in eyes or on clothing. Calcium hypochlorite may produce severe chemical burns. Wear eye protection, gloves and protective clothing when using this product. Do not breathe the dust or fumes.

Be sure to wash [illegible] after handling [illegible] hypochlorite.

ENVIRONMENTAL HAZARD

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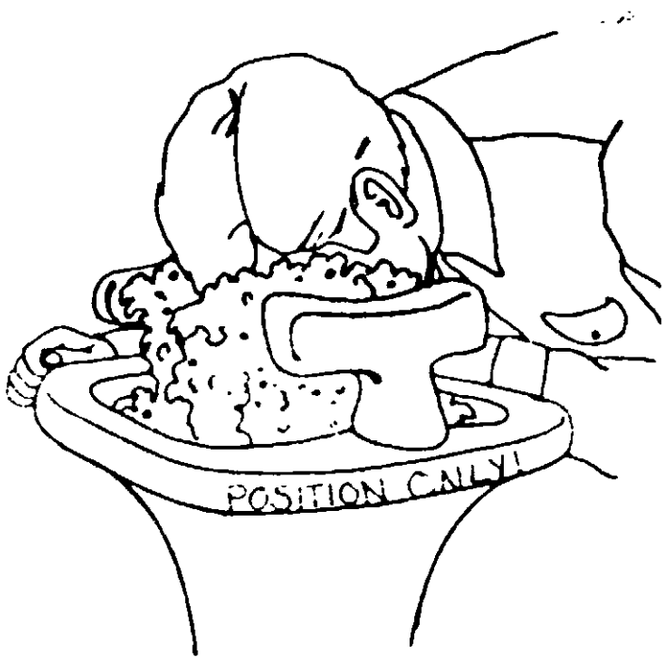
[illegible] Do not introduce calcium hypochlorite into lakes, streams, ponds, or public waters unless in accordance with NPDES permit.

FIRST AID

Eye or Skin Contact: Flush with plenty of water for at [illegible] immediate medical attention.

Inhalation: Remove person(s) affected to fresh air. If signs of irritation or discomfort occur, take the person to a hospital or physician immediately.

If Swallowed: If the person is conscious, give large quantities of water to drink followed by any common acceptable cooking oil if available. Do not induce vomiting. If vomiting occurs, administer additional water. [illegible] or in convulsions, do not attempt to give anything by mouth. Get medical attention immediately.



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PREPARING CALCIUM HYPOCHLORITE SOLUTIONS

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[illegible] parts per million (ppm) or percent available chlorine. To prepare the proper strength solution, follow these simple directions

1. Use a clean, **non-metallic** container free of grease, oil or residue

[illegible]

4. Use immediately

NOTE: As a safety precaution prepare only the amount of solution needed. Never store a calcium hypochlorite solution

CALCIUM HYPOCHLORITE MEASUREMENT EQUIVALENTS

Dry Weight	Household Measurement*
1/6 ounce	1 level teaspoon
1/2 ounce	1 level tablespoon
1 ounce	2 level tablespoons
[illegible] ounces	16 level tablespoons [illegible]

[illegible]

The following table indicates the amount of calcium hypochlorite needed to make various quantities of solution containing from [illegible] to 10,000 ppm available chlorine

Available Chlorine (ppm)*	Weight of Calcium Hypochlorite Required to Make Solution							
	1 gallon		10 gallons		50 gallons		100 gallons	
	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.
5	0	0.001	0	0.01	0	0.05	0	0.10
10	0	0.002	0	0.02	0	0.10	[illegible]	[illegible]
25	0	0.005	0	0.05	0	0.26	0	[illegible]
50	0	0.01	0	0.10	0	0.51	[illegible]	[illegible]
100	0	0.02	0	0.21	0	[illegible]		[illegible]
125	0	0.03	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
200	0	0.04	[illegible]	0.41	0	[illegible]		[illegible]
300	0	0.06	0	0.62	0	3.08	[illegible]	6.16
500	0	0.11	0	1.03	0	5.13	0	10.27
600	0	0.12	0	1.23	0	6.16	0	12.32
1000	0	0.21	0	2.05	0	10.26	1	4.53
2500 (.25%)	0	0.51	0	5.13	1	9.66	3	3.32
5000 (.5%)	0	1.03	0	10.26	3	3.32	6	6.65
10,000 (1%)	0	2.05	1	4.53	6	6.65	12	13.29

*Parts available chlorine per million parts of water

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One PPG Place
Pittsburgh, PA 15272

19/39

Printed in U.S.A.

CALCIUM HYPOCHLORITE

Multi-Purpose Disinfectant And Sanitizing Agent

ACCEPTED
748-239
MAR 12 1984

AGRICULTURAL farm buildings and enclosures poultry plants harvested potatoes harvested sweet potatoes mushrooms bee cells and boards harvested fruits harvested vegetables seeds AQUACULTURAL fish ponds fish pond equipment maine lobster ponds conditioning live oysters control of scavenger fish in hatchery ponds boat hulls BEVERAGE PLANTS breweries fermenting tubs false bottoms washing equipment malting areas aging cellars water supplies carbonated beverage plants water supplies pumps cider plants wineries plant sanitization vessels vats casks presses grape crushers bottles corks mold control tanks grape juice plants FOOD PROCESSING PLANTS egg breaking operations cups knives trays breaking rooms freezers pipelines fish processing plants equipment treating packaging pecan cracking and bleaching bacteria control sugar refineries dust collectors vacuum pans sugar bags beet sugar processing canneries coolant water wastes meat processing plants rooms equipment utensils DAIRY INDUSTRIES creameries ice cream factories cheese factories milk plants processing equipment weigh tanks pasteurizers homogenizers fillers sanitary piping bottle fillers can fillers tank trucks INSTITUTIONAL, COMMERCIAL, AND HOME sanitizing nonporous food contact surfaces sanitizing porous food contact surfaces sanitizing nonporous non-food contact surfaces sanitizing porous non-food contact surfaces disinfecting nonporous non-food contact surfaces general disinfection controlling mold or mildew bathrooms asphalt or wood roofs sidings SANITIZING DIALYSIS MACHINES preparing calcium hypochlorite solutions

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748-239

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CALCIUM HYPOCHLORITE

POSITION ONLY!

PPG calcium hypochlorite is a dry, white free-flowing granular material. In solution with water it is used as a general disinfectant to destroy bacteria, algae, fungi, and other microorganisms [illegible] and water, [illegible] of disinfecting drinking water and as a sanitizer in a variety of food processing, commercial, institutional, and domestic applications.

PPG calcium hypochlorite is efficient, easy to use and handle. Solutions can be prepared quickly for on the spot use from the economical drums and convenient pails and pits provided by PPG. [illegible] calcium hypochlorite as Pitabs.™ All are high quality calcium hypochlorite products containing a minimum of 65% available chlorine.

Any of these products may be used for the applications described in this brochure provided directions are followed and this brochure is in the possession of the user at the time of application.

Calcium hypochlorite applications for treating water supplies, wells, and waste are described in a separate booklet "Using PPG Calcium Hypochlorite for Water Supplies and Sewage [illegible]

[illegible] for treating swimming pool water are described in a brochure "Crystal Water the Pittclor Way" form A-1470, also available on request.

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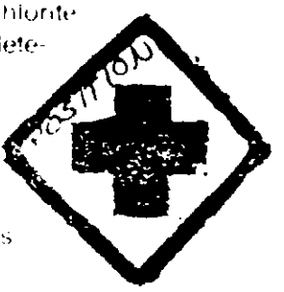
NOTE: Calcium Hypochlorite refers to the following products: INDUCLOR™ - EPA Reg. No. 748-239, PITTCLOR® - EPA Reg. No. 748-217, PITTABS® - EPA Reg. No. 748-138, and Calcium Hypochlorite FR - EPA Reg. No. 748-216

BEST DOCUMENT AVAILABLE

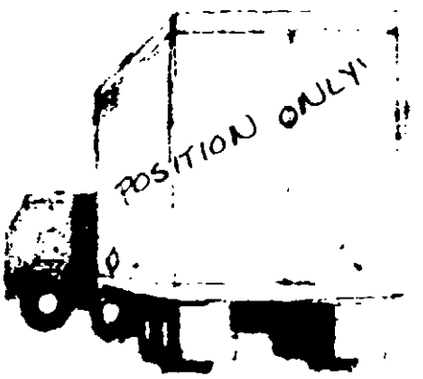
PRECAUTIONS AND SAFETY MEASURES

[illegible] chemical when properly stored and handled. However, it is highly corrosive and a strong oxidizing agent. Calcium hypochlorite is not flammable, but in the presence of contaminates or other chemicals, it can cause fire or explosion.

Everyone who handles calcium hypochlorite must be completely familiar with proper handling, storage, and safe practices as well as first aid emergency procedures in case of accident.



Note: The U.S. Department of Transportation regulates transportation of calcium hypochlorite as "hazardous material." As serious penalties can be imposed for violation of DOT regulations, everyone who transports [illegible] must be familiar with and follow them.



HANDLING AND STORAGE

[illegible] All handling and storage [illegible] on the container must be followed to ensure accident-free use of the chemical.

Do not slide or drop calcium hypochlorite containers. Store the chemical in its original container in a cool, dry place. Be sure the calcium hypochlorite container is tightly closed when not in use. Keep calcium hypochlorite away from heat sources [illegible] product [illegible] water. Since calcium hypochlorite supplies oxygen, attempts to smother the fire with a wet blanket, carbon dioxide or dry chemical extinguisher are ineffective.

Avoid getting in eyes or on clothing. Calcium hypochlorite may [illegible] chemical burns. Wear eye protection, gloves, and protective clothing when using this product. Do not breathe dust or fumes.

Be sure to wash your hands after handling calcium hypochlorite.

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Use only a clean, dry scoop made of plastic or rubber to place calcium hypochlorite in a dry container. Add [illegible] brought [illegible] with [illegible] easily combustible materials such as oil, kerosene, gasoline, paint products and any other organic materials.

In Case Of Spill Or Leak

Use extreme caution. Contamination may cause fire or violent reaction. If fire or reaction occurs in area of spill douse with plenty of water. Otherwise sweep up spilled material, using a clean dry shovel and broom and dissolve spilled material in water. Use the solution [illegible]

[illegible] with water [illegible]

ENVIRONMENTAL HAZARD

[illegible] public waters unless in accordance with NPDES permit.

FIRST AID

[illegible] clarification.

Inhalation: Remove person(s) affected to fresh air. If signs of irritation or discomfort occur, take the person to a hospital or physician immediately.

If Swallowed: If the person is conscious, give large quantities of water to drink followed by any common vegetable cooking oil available. Do not induce vomiting if vomiting occurs administer [illegible] Take the person [illegible] induce vomiting [illegible] mouth. Get medical [illegible] immediately.

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AGRICULTURAL USES:

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Farm Buildings and Enclosures

Regularly clear all livestock, poultry and other animals as well as their feed from premises, enclosures, vehicles etc. Clean all litter and manure from floors, walls and surfaces of facilities occupied or traversed by animals or poultry. Empty all troughs and other feeding and watering devices. Thoroughly clean all surfaces with soap or detergent and rinse with water. Disinfect by saturating all surfaces with a solution of at least 1000 ppm available chlorine* for a period of 10 minutes. Also, immerse all halters, ropes, cages and other equipment used in handling and restraining animals or poultry, the cleaned forks, shovels and scrapers used for removing litter and manure in this solution. Ventilate the buildings, vehicles and closed spaces. Do not re-house livestock or poultry or re-employ equipment until chlorine has been dissipated. Disinfected feed racks, automatic feeders, fountains and waterers must be rinsed with potable water before reuse.

Poultry Plants

Calcium hypochlorite solutions will control odors and bacterial growth in poultry feeding and dressing plants. Poultry feeding areas, dropping boards, feeding troughs and watering fountains should receive regular treatment with solutions containing 5000 ppm available chlorine.

Spray or flush dropping boards and feeding troughs thoroughly with the solution.

Watering fountains should be rinsed with this solution. In float control fountains, treat poultry drinking water with 1 oz. of calcium hypochlorite by using a chlorinator feeder. In portable fountains, treat poultry drinking water by adding 1 oz. of calcium hypochlorite for every 1000 to 5000 gallons of poultry drinking water.

Clean poultry dressing areas regularly before treatment. Immediately after, spray the walls, tables, floors and ceilings with a solution containing 5000 ppm available chlorine.

Clean equipment and utensils should be rinsed with a 200 ppm available chlorine solution. After immersing for 2 minutes, rinse all metal surfaces with clear water.

POSITION ONLY!

Harvested Potatoes

To help control and reduce the spread of organisms which cause soft rot, sanitize potatoes after cleaning and prior to storage by spraying with a solution containing 500 ppm available chlorine at a dosage of 1 gallon of sanitizing solution per ton of potatoes. Spray the solution over the potatoes as they enter storage on a conveyor line. Provide tumbling action during this treatment.

Harvested Sweet Potatoes

To control and reduce the spread of soft rot-causing organisms in water and on sweet potatoes (Ipomoea batatas), spray potatoes with a 150 to 500 ppm solution for 2 to 5 minutes.

If a dip is used, monitor the solution hourly and add enough calcium hypochlorite to the solution to maintain the 150 to 500 ppm level. Or, change the solution hourly (or as frequently as necessary) to prevent the available chlorine level from dropping too low.

*Directions for solution preparation are found on page 19.

Mushrooms

[illegible] control bacterial blotch (Pseudomonas [illegible]) [illegible] 100 to 200 ppm [illegible] mushroom [illegible] bacteria [illegible] first application should be [illegible] pins form and thereafter [illegible] based depending [illegible] occurrence of bacterial blotch. Calcium hypochlorite may be applied directly to pins to control small infection foci. Apply 1.5 to 2.0 oz. per square foot of growing space.

Bee Cells and Boards

Immerse leafcutter bee cells and bee boards in a solution containing 1 ppm available chlorine for 3 minutes to disinfect. Allow [illegible] drain for 2 minutes and dry [illegible] or until no [illegible]. This solution is [illegible] by mixing 1 1/4 Tsp. of [illegible] in 200 gallons of water. Bee domiciles are disinfected by spraying with a 0.1 ppm solution until all surfaces are thoroughly covered. Allow the domicile to dry until chlorine odor has dissipated before placing in use.

Harvested Fruits

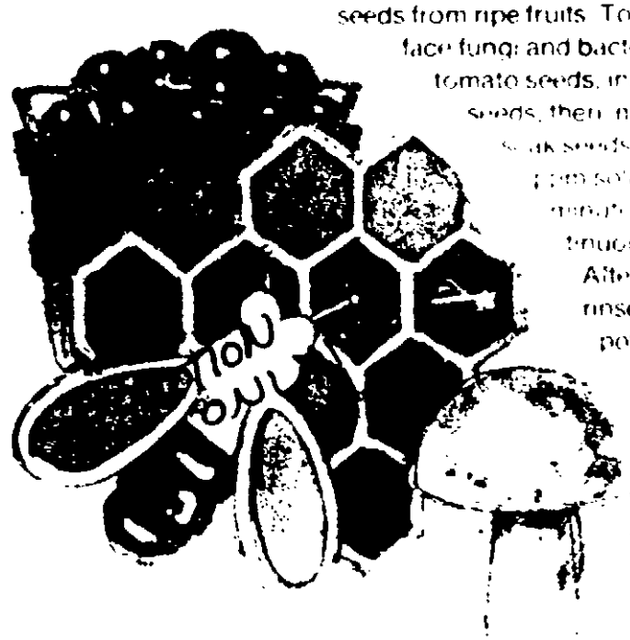
Calcium hypochlorite solutions containing 25 ppm available chlorine can reduce harmful bacteria and improve the keeping properties of fruit. First clean all fruit in wash tank. Then prepare 25 ppm available chlorine solution. Soak the fruit for two minutes in the solution, then rinse with potable water.

Harvested Vegetables

First remove surface soil and debris from vegetables in a wash tank. After [illegible] washing spray rinse with fresh calcium hypochlorite solution, rinse with potable water and then package.

Seeds

Bacterial spot (Xanthomonas vesicatoris) on pimentos seeds may be controlled by initially removing moist seeds from ripe fruits. To control surface fungi and bacteria on tomato seeds, initially wash seeds, then immediately soak seeds in 59,000 ppm solution for 15 minutes with continuous agitation. After treatment rinse seeds in potable water for 15 minutes. Dry seeds to normal moisture. Make this solution by mixing 8 oz. of this product with 1 gallon of water.



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AQUACULTURAL USES:

Fish Ponds

Remove all fish from ponds prior to treatment. Thereafter, thoroughly mix 20 oz. of calcium hypochlorite for each 10,000 gallons of pond water. Repeat the treatment if the available chlorine level is below 1 ppm after [illegible] minutes. Return fish to the pond after the available chlorine level reaches zero.

Fish Pond Equipment

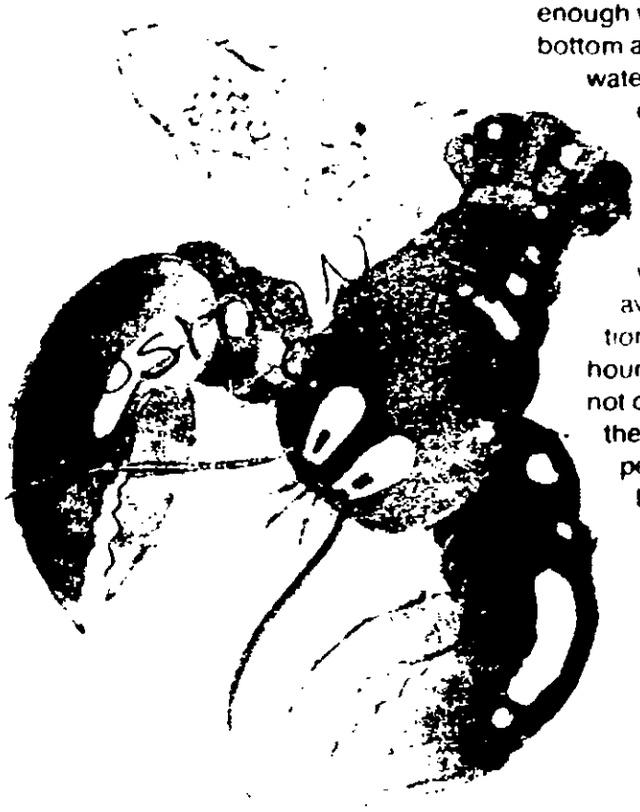
Clean all physical soil from equipment prior to treatment. Soak equipment in a solution of 200 ppm available chlorine. Porous equipment should soak for one hour.

Maine Lobster Ponds

Remove lobsters, seaweed, etc. from ponds prior to treatment. Drain the pond and thoroughly mix [illegible] pounds of calcium hypochlorite to each 10,000 gallons of pond water. Apply evenly so that all barrows, gates, rocks, and dam are treated with the product. Permit high tide to fill the pond and then close gates. Allow water to stand for 2 to 3 days until the available chlorine level reaches zero. Open gates and allow 2 tidal cycles to flush the pond before returning lobsters to the pond.

Conditioning Live Oysters

Mix 1 oz. of this product [illegible] with each 10,000 gallons of water at 50 to 70 degrees F. [illegible] oysters to this solution [illegible] minutes, monitoring the available chlorine level [illegible] below 0.05 ppm. Repeat the entire process if the available chlorine level drops below 0.05 ppm or the temperature falls below 50 degrees F.



Control of Scavenger Fish in Hatchery Ponds

Prepare a 200 ppm solution. Pour into drained pond [illegible] necessary. [illegible] residual has [illegible] ppm as determined by a test kit.

Boat Hulls

To control slime on boat hulls, sling a plastic tarp under the boat, retaining enough water to cover the fouled bottom area. Do not allow additional water to enter enclosed area. This envelope should contain approximately 500 gallons of water for a 14 foot boat. Add [illegible] calcium hypochlorite [illegible] enclosed water to [illegible] ppm available chlorine concentration. Leave [illegible] for 8 to 12 hours. Repeat if necessary. Do not discharge the solution until the free chlorine level has dropped to 0 ppm as determined by a swimming pool test kit.

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BEVERAGE PLANTS:

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Breweries

Calcium hypochlorite solutions enable breweries to prevent bacterial growth and assure the purity and fresh taste of their products [illegible] risks.

As a general [illegible] chlorite is doubly effective because of its dissolving action on beer stone, proteins, slime, yeast, and other matter commonly found in brewery lines, tanks, hoses, etc.

To prepare a stock cleaning and sanitizing solution, add 5 pounds of calcium hypochlorite to three gallons of warm water in a 20-gallon container. Introduce 3 pounds of soda ash and stir until dissolved. Dilute this mixture with cold water to make 15 gallons of solution, then add 5 pounds of Pels® caustic soda beads. Stir to dissolve [illegible] allow to stand. When diluted 1-to-10 with water, this solution is an excellent cleaner/sanitizer for piping and equipment, steel, tile and concrete vats. Rinse equipment with potable water before reuse.

Filter Pulp:

Calcium hypochlorite solutions remove colloidal deposits and coloring matter on wood pulp being used as a filtering agent, thereby restoring maximum efficiency.

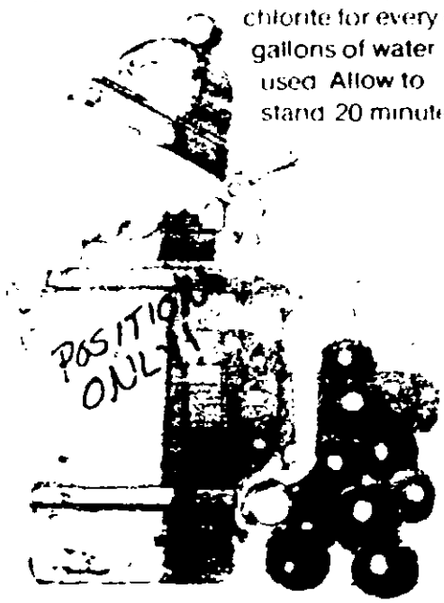
Wash the wood pulp filter mass in the usual manner. Shut off washer water flow after washing. Add 1 oz. of calcium hypochlorite for each gallon of water in the washer to remove colloidal deposits. Run the washer with solution for 60 minutes. If a washer is not used, soak the pulp in water containing 1 oz. of calcium hypochlorite per 10 gallons of water. Remove pulp after letting stand for 10 - 15 minutes at 150 degrees F. Rinse with potable water.

Fermenting Tubs—Cypris:

Clean and rinse the tub thoroughly to remove all traces of oil, then fill with a 500 ppm available chlorine solution. Allow to stand [illegible] Rinse with potable water before reuse.

False Bottoms:

Sanitize false bottoms by covering them with warm water and broadcasting one pound of dry calcium hypochlorite for every 4 gallons of water used. Allow to stand 20 minutes.



Washing Equipment:

Sanitize the washing equipment by first thoroughly cleaning to remove physical soil, then flushing all surfaces with calcium hypochlorite solution containing 500 ppm available chlorine. Rinse thoroughly before reuse.

Malting Areas:

Floors and walls around malt tanks should be thoroughly washed once a week to prevent mold formation and odor. After cleansing, flush both floors and walls with a solution containing 0.25% available chlorine.

Aging Cellars:

Spray the concrete walls of aging cellars regularly with a calcium hypochlorite solution of 0.5% available chlorine to destroy existing mold and mildew and prevent odor.

Pasteurizers:

Slime and odors that develop in pocket-type pasteurizers can be controlled with regular use of a [illegible] available chlorine [illegible] pasteurizer with a spray hypochlorinator. After [illegible] a dosage of 0.5 to [illegible] ppm available chlorine at the overflow is required for optimum results. After draining and cleaning pasteurizers, the hypochlorinator should be used to provide fresh refill water with the proper chlorine residual.

Grain Steep Tanks:

Calcium hypochlorite is highly effective in controlling mold growth in humid malt house conditions. Steep tanks should be washed lightly with water first, then sprayed with a 1.5 to 2.0% available chlorine solution. After a 30-minute contact time, spray the tanks with high pressure potable water.

The walls of concrete germination compartments should also be washed lightly and treated as above.

The perforated metal floors of germination compartments should be sprayed with high pressure water and then covered at a rate of 0.15 oz. of dry calcium hypochlorite per square foot of wet floor. (A clean, dry, uncontaminated broadcaster or spreading device may be used effectively.) Allow the coating to stand for 30 minutes, then wash away thoroughly with high pressure potable water.

Water Supplies:

Calcium hypochlorite solutions containing 1% available chlorine will properly sanitize plant water used in the production of beer.

The calcium hypochlorite solution should be introduced into the water supply by a hypochlorinator. An available chlorine residual of 0.1 to 0.2 ppm must be maintained throughout the system at all times. Be sure to dechlorinate the water before it is used to process beer.

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Carbonated Beverage Plants

Water Supplies

[illegible] should be introduced by a hypo chlorinator and adjusted to supply an available chlorine residual of 0.1 to 0.2 ppm at all times.

Be sure to dechlorinate the water before it is used to process beverages.

Manufacturing Equipment:

The use of calcium hypochlorite is a reliable and economical way to sanitize equipment and control the quality and taste of carbonated beverages.

Before bottling operations start up [illegible] After each bottling operation, thoroughly spray syrup tanks with a 200 ppm available chlorine solution. Let stand for 30 minutes and rinse by spraying with potable water.

Cider Plants

Even when stored under cold conditions, sweet cider is particularly susceptible to fungus growth, which causes spoilage. As a preventive, treat each cask with a 3% available chlorine solution [illegible] Be sure to rinse with potable water before refilling.

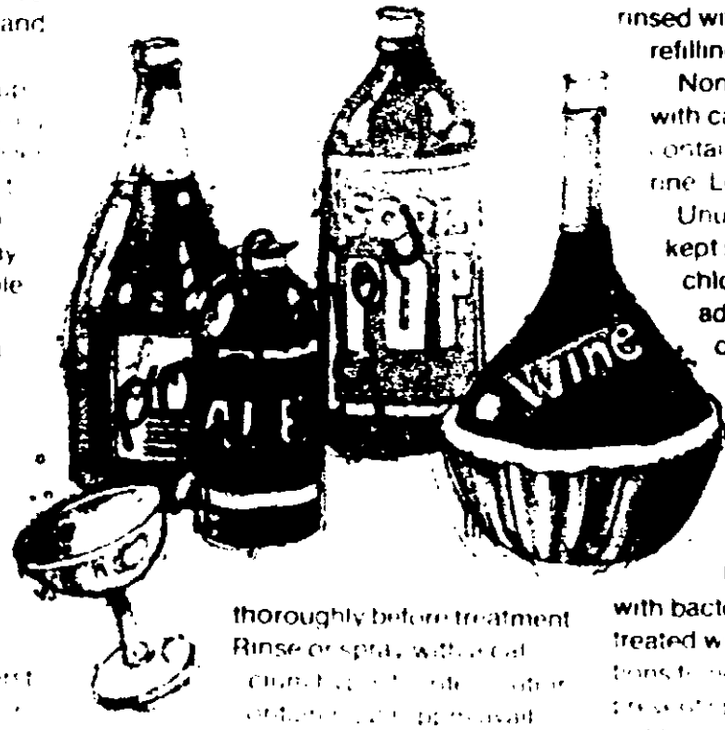
Wineries

Plant Sanitization:

Calcium hypochlorite will prevent contamination in wineries to insure product quality. Following each run clean the entire plant area and its equipment. Immediately before the next run, disinfect with calcium hypochlorite as follows.

Rinse nonporous wall surfaces, floors and equipment with a calcium hypochlorite solution containing 500 ppm available chlorine. Let stand 10 [illegible] with a 1000 ppm available chlorine solution. Let stand 10 minutes, then rinse any surface that will come into contact with the wine with potable water.

Storage vessels, fermenting vats, casks, presses and grape crushers should be cleaned of physical soil thoroughly before treatment. Rinse or spray with a calcium hypochlorite solution containing 500 ppm available chlorine. Let stand 10 minutes and wash thoroughly with potable water.



Sanitize bottles and corks by immersing them for 5 minutes in a tank containing 200 ppm available chlorine. Rinse thoroughly to remove any remaining chlorine.

Mold Control:

Mold growth should be treated on discovery with calcium hypochlorite to prevent further spreading.

Spray the affected surfaces with a calcium hypochlorite solution providing 0.5% available chlorine. Heavy growth may require [illegible] repeated applications.

Storage and Filling Tanks:

Disinfect storage and filling tanks with calcium hypochlorite to maintain a high level of product quality.

After a run and before refilling tanks, they should be thoroughly sanitized with calcium hypochlorite. Wooden tanks should be filled with calcium hypochlorite solutions containing 500 ppm available chlorine. Solutions should stand for an hour and the tanks rinsed with potable water before refilling.

Nonporous tanks should be filled with calcium hypochlorite solutions containing [illegible] available chlorine. Let stand [illegible] then flush.

Unused tanks and vats should be kept sanitized with calcium hypochlorite. Fill each with water and add dry calcium hypochlorite to obtain a residual of approximately 15 ppm available chlorine. Test every week and repeat treatment if residual falls below 2 ppm.

Press Cloths:

Press cloths contaminated with bacteria or organic matter must be treated with calcium hypochlorite solutions to sanitize microorganisms and [illegible] fouling.

After use, wash cloths thoroughly, then soak as follows. For every 100 pounds dry weight of the cloth, add 2 oz. dry calcium hypochlorite to 60 gallons of water. Soak for 15 minutes.

Grape Juice Plants

Sanitize equipment and problem areas of grape juice plants using the same treatment procedures recommended for wineries.

FOOD PROCESSING PLANTS:

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Egg Breaking Operations:

[illegible]

Food Egg Product Sanitization

[illegible] 200 ppm available [illegible] using warm water (Temperature should not exceed 130 degree F.) Spray the warm sanitizer over eggs so that they are thoroughly wetted. Allow the eggs to dry before casing or breaking. Do not apply potable water rinse. The solution should not be reused to sanitize eggs.

Cups, breaking [illegible], trays and any other equipment [illegible] contact with [illegible] placing back [illegible] spray with a calcium hypochlorite solution containing 50 to 200 ppm available chlorine following USDA guidelines.

In egg breaking rooms, all equipment and surfaces should be deodorized and sanitized with solutions of calcium hypochlorite. After cleaning, and just prior to using, spray, wipe, or rinse tables, stools, walls and floors with a calcium hypochlorite solution containing 1000 ppm available chlorine.

Sanitize egg freezers and dryers [illegible] generally used [illegible] porous surfaces [illegible] free of physical soil.

Prepare a calcium hypochlorite solution containing 200 ppm available chlorine. If possible, use pressure spraying or fogging equipment designed for use with hypochlorite solutions (plastic, rubber coated, or stainless steel.) When using other types of spraying equipment, be sure to empty and rinse thoroughly with fresh water immediately after use.

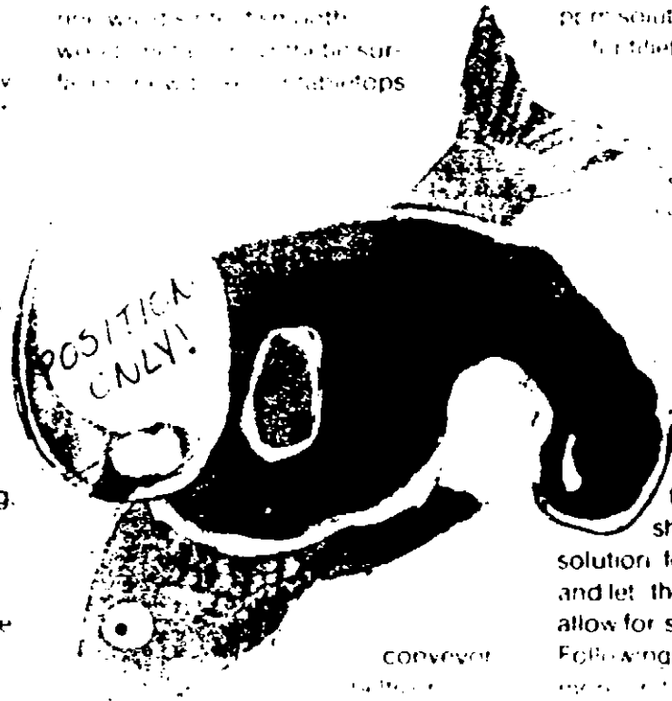
[illegible] eggs will [illegible] Allow excess solution [illegible] in service.

Fish Processing Plants

[illegible] thoroughly with hot water [illegible] powder to remove air [illegible] before treatment.

Hard or Nonporous Surfaces:

Calcium hypochlorite solutions containing [illegible] ppm available chlorine [illegible] for surfaces [illegible] tabletops



conveyor [illegible] with calcium hypochlorite solution for 2 to 5 minutes. Let stand 2 minutes. Rinse metal surfaces with fresh water.

Soft or Porous Surfaces:

Calcium hypochlorite solutions containing 1000 to 5000 ppm available chlorine will sanitize soft or porous surfaces (worm tables, old boxes, concrete floors and walls). Flood surfaces with calcium hypochlorite solution for 2 to 5 minutes. Let stand 2 minutes. Rinse metal surfaces with fresh water.

Fish Filleting:

Calcium hypochlorite solutions will [illegible] the growth [illegible] on fish and [illegible] has been treated with enough product to produce a chlorine residual of 25 ppm as determined by a test kit. Remove fish from treated water and refrigerate at 37 degrees F for 24 to 48 hours before filleting. After scaling, the fish should again be washed in a 25 ppm solution. The fish are then ready for filleting and packaging.

Pecan Cracking and Bleaching

[illegible] preparation [illegible] drying.

Calcium hypochlorite solution containing 1000 ppm available chlorine reduce bacteria in pecans without affecting the taste. Prior to cracking and shelling, soak the pecans in the solution for at least 10 minutes. Remove and let the pecans age for 24 hours to allow for softening of the meat. Following this, the pecans will crack [illegible] able chlorine [illegible] pecan shells. Before bleaching, wash the pecans in a rotary cleaner. Rinse, drain and soak the pecans in a 2% sulfuric acid bath at 27 degrees to 32 degrees C (80 to 90 degrees F) for one minute. Afterward, place the pecans in the calcium hypochlorite solution for 4 to 8 minutes. When the pecans are bleached white, drain and wash in a 1% sulfuric acid bath at 27 to 32 degrees C. After drying, they are ready to be dyed.

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Sugar Refineries

[illegible] hypochlorite solutions [illegible] the refining process [illegible]

Dust Collector Bacteria:

[illegible] solutions control the dust collector bacteria and reduce sugar inversion significantly while eliminating slime completely.

A solution containing 8% available chlorine should be continuously gravity fed into the recirculating low-concentration syrup in the dust collector. Add it [illegible] regularly so that syrup leaving the dust collector contains a [illegible] of 10 ppm.

Gum-Forming Bacteria:

[illegible] which allows [illegible] hypochlorite solution.

Apply the solution to raw sugar as it is spun in the centrifugals. If this is not practical, introduce the solution in the syrup tank.

Thermophilic Bacteria in Vacuum Pans:

Thermophilic bacteria multiply rapidly in vacuum pans. Solutions containing one pound of calcium hypochlorite for every [illegible] of sugar (dry weight) will effectively control these bacteria. Add the solution [illegible] sugar in [illegible]

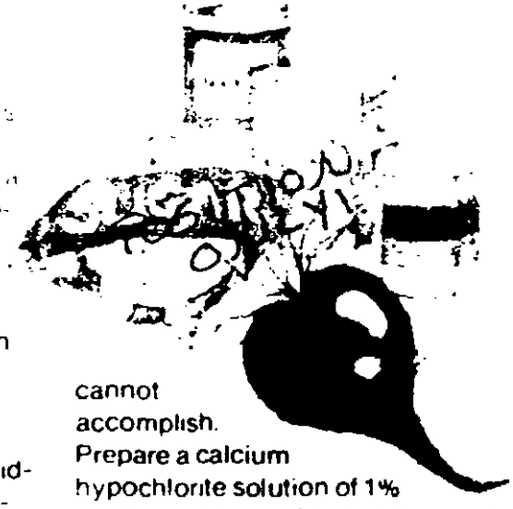
General Sanitization

Solutions of calcium hypochlorite of 500 ppm available chlorine will thoroughly [illegible] pipes, tanks, and other equipment in sugar refineries.

[illegible] and flushed [illegible] with pot[illegible] products.

Sugar Bags:

Proper use of dry calcium hypochlorite during the washing process will thoroughly sanitize and deodorize sugar bags which normal washing cannot accomplish.



Prepare a calcium hypochlorite solution of 1% available chlorine. Mix in 3/4 pound of soda ash for each pound of dry calcium hypochlorite. Allow to settle.

Add this solution to the bag washer [illegible] minutes after application, test for available chlorine. A residual of 50 ppm should remain in the wash water. If not add more solution, wait 5 minutes and test again.

Beet Sugar Plants:

A calcium hypochlorite solution containing 1 to 3% available chlorine will remove undesirable odors and impurities from reusable beet sugar waste water. The solution must remain in contact with the waste for 10 to 30 minutes.

Continuous treatment may be accomplished by a hypochlorinator. The [illegible] should be applied to the washed [illegible] the plant. After [illegible] treatment [illegible]

For treating [illegible] wash water that will not be reused, apply a calcium hypochlorite solution to provide a residual of 10 to 15 ppm for at least 30 minutes, every 4 to 5 days. This will prevent flume contamination.

Canneries

Hot, freshly-packed cans are often cooled by immersion in cold water. This creates a partial vacuum in the container which may allow the cooling water to enter through [illegible] pin holes. If bacteria are present in the water, contents may [illegible] contaminated and spoil.

Calcium hypochlorite solutions providing 1% available chlorine should be fed into cooling tanks or channels by an elevated tank to provide a concentration of 2 ppm available chlorine. The flow may be controlled with a noncorroding valve or a pinch-stop on a rubber hose.

Feed points should be located to provide uniform distribution of solution throughout the entire system. Long and narrow tanks may require the solution to be fed at two points to insure proper distribution.

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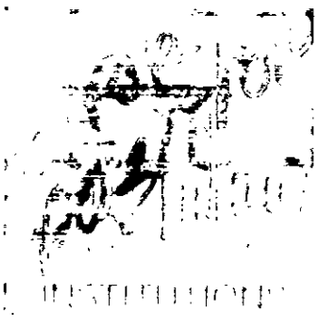

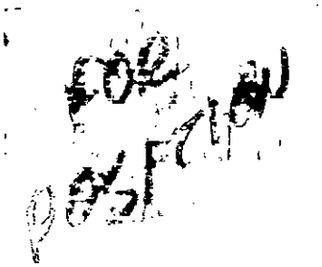

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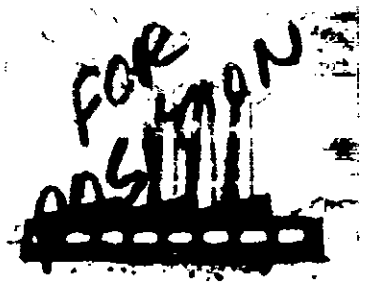
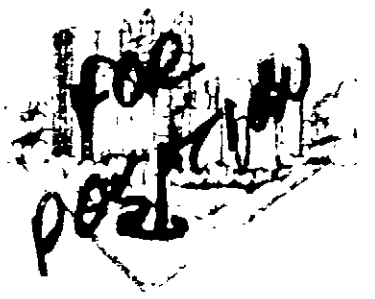


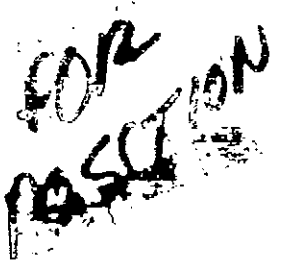
INDUSTRY

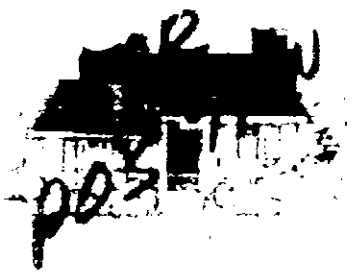
INSTITUTIONS

TESTING

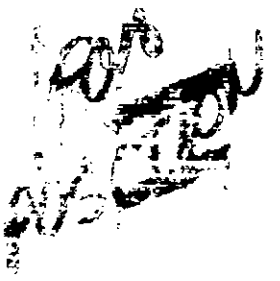


CITIES





HOMES



IPC CALCIUM HYPOCHLORITE

is efficient

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Spray Fog Method

[illegible] surfaces after [illegible] available chlo[illegible] Vacate area for at least 2 hours. Prior to using equipment, rinse all surfaces treated with a 600 ppm solution with a 200 ppm solution. Empty and rinse spray/fog equipment with potable water.

Sanitizing Porous Food Contact Surfaces

Rinse Method:

Pre[illegible] approximately [illegible] maintaining contact with the sanitizer for at least 2 minutes. Rinse equipment with potable water after treatment.

Immersion Method:

Prepare a sanitizing solution of approximately 600 ppm available chlorine by weight. Clean the equipment in a normal manner. Immediately immerse the equipment in the sanitizing solution for at least 2 minutes. Allow the solution to drain and rinse equipment with potable water.

Spray Fog Method

[illegible] sanitizing solution. Use spray or fogging equipment which resists hypochlorite solutions. Thoroughly spray or fog all surfaces until wet, allowing excess sanitizer to drain. Vacate the area for at least 2 hours. Prior to using the equipment, rinse all surfaces with a 200 ppm available chlorine solution. Rinse spray/fog equipment with potable water.

Sanitizing Nonporous Non-Food Contact Surfaces

Rinse Method:

[illegible] with a 2[illegible] ppm [illegible] at least 2 minutes. Do not rinse after treatment and do not soak equipment overnight.

Immersion Method:

Clean the equipment in normal manner. Immediately immerse in a 200 ppm available chlorine solution for at least 2 minutes and allow the sanitizer to drain. Do not rinse after treatment.

Spray/Fog Method:

Preclean all surfaces after use. Pre[illegible] 200 ppm available chlorine solu[illegible] equipment [illegible] solutions [illegible] surfaces [illegible] excess solution to drain. Vacate area for at least 2 hours.

Sanitizing Porous Non-Food Contact Surfaces

Rinse Method:

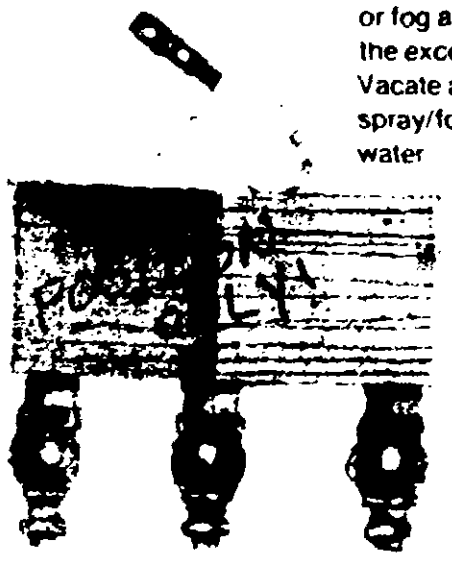
Prepare a [illegible] solution of [illegible] available chlo[illegible] surfaces [illegible] surfaces thoroughly with the sanitizing solution, maintaining contact with the sanitizer for at least 2 minutes. Do not rinse equipment after treatment. Do not soak equipment overnight.

Immersion Method:

Prepare a sanitizing solution of approximately 600 ppm available chlorine by weight. Clean the equipment in a normal manner. Prior to use, immerse the equipment in this sanitizing solution for at least 2 minutes. Allow the sanitizer to drain. Rinse equipment after treatment.

Spray/Fog Method:

After cleaning, sanitize non-food contact surfaces with a solution containing 600 ppm available chlorine. Use spray or fogging equipment which resist hypochlorite solutions. Prior to using the equipment, thoroughly spray or fog all surfaces until wet, allowing the excess sanitizer solution to drain. Vacate area for at least 2 hours. Rinse spray/fog equipment with potable water.



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HYPOCHLORITE'S MANY USES

POSITION ONLY!

To treat ... supplies

POSITION ONLY!

To sanitize wells

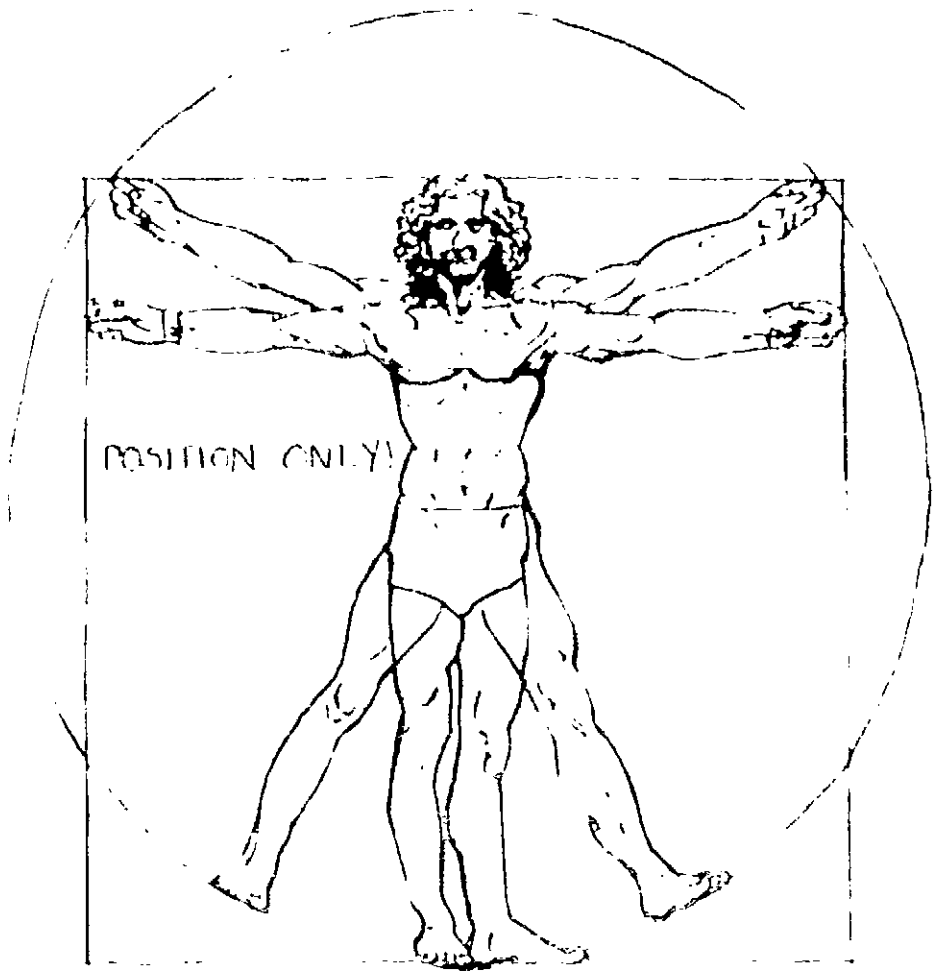
POSITION ONLY!

POSITION ONLY!

POSITION ONLY!

HOW TO USE CALCIUM HYPOCHLORITE IN WATER SYSTEMS

DEFECTIVE DOCUMENT



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PREPARING CALCIUM HYPOCHLORITE SOLUTIONS

Each of the applications described in this brochure requires a specific concentration of solution measured in parts per million (ppm) or percent available chlorine. To prepare [illegible] strength solution, follow [illegible] instructions.

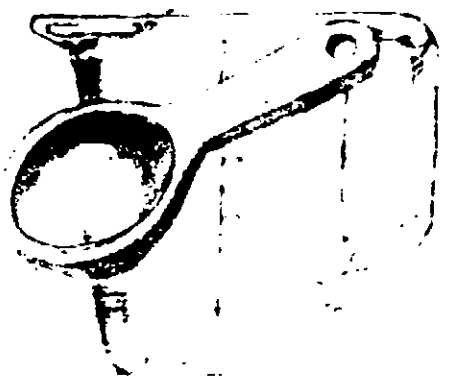
1. Use a clean, non-metallic [illegible] container free of grease [illegible] chlorides due [illegible]
2. Add granular calcium hypochlorite to lukewarm water.
3. Stir for three to five minutes.
4. Use within half [illegible]

NOTE: As a safety [illegible] prepare only the amount [illegible] needed. Never [illegible] solution.

CALCIUM HYPOCHLORITE MEASUREMENT EQUIVALENTS

Dry Weight	Household Measurement*
1/6 ounce	1 level teaspoon
1/2 ounce	1 level tablespoon
1 ounce	2 level tablespoons
8 ounces	16 level tablespoons (1 cup)

*These household measurement equivalents are only approximate values given for the user's convenience.



The following table [illegible] the amount of calcium hypochlorite required to make various quantities of solution [illegible] concentrations from 5 to 10,000 ppm available chlorine.

Available Chlorine (ppm)*	Weight of Calcium Hypochlorite Required to Make Solution							
	1 gallon		10 gallons		50 gallons		100 gallons	
	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.
5	[illegible]	0.001	0	0.01	0	0.05	0	0.10
10	0	0.002	0	0.02	0	0.10	0	0.21
25	0	0.005	0	0.05	0	0.26	0	0.51
50	0	0.01	0	0.10	0	0.51	0	1.03
100	0	0.02	0	0.21	0	1.03	0	2.05
150	0	0.03	0	0.31	0	1.54	0	3.08
200	0	0.04	0	0.41	0	2.05	0	4.11
300	0	[illegible]	0	0.62	0	3.08	0	6.16
500	0	[illegible]	[illegible]	1.03	0	5.13	0	10.27
600	0	[illegible]	[illegible]	1.23	0	[illegible]	[illegible]	12.32
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]	4.53
2500 (2.5%)	[illegible]	[illegible]	[illegible]	5.13	[illegible]	[illegible]	[illegible]	3.32
5000 (5%)	0	1.03	0	10.26	3	3.32	6	6.65
10,000 (1%)	0	2.05	1	4.53	6	6.65	12	13.29

*Parts available chlorine per million parts of water.

The statements and the [illegible] products [illegible] information and practice [illegible] at the present time, but are [illegible] results [illegible]

[illegible] and pass authority [illegible] before using [illegible]

The products [illegible] hazardous materials [illegible] children.

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