Hasa, Inc.

HASACHLOR NSF MULTI-CHLOR

Certified To NSF/ANSI 60
Max Use Level: 84 mg/L

Active Ingredient:

Sodium Hypochlorite.....12.5%
Other Ingredients: 87.5%
Total.....100.0%

KEEP OUT OF REACH OF CHILDREN

DANGER

	FIRST AID
IF IN EYES	• Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
IF ON SKIN OR CLOTHING	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
IF INHALED	• Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. • Call a poison control center or doctor for further treatment advice.
IF SWALLOWED	• Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give anything by mouth to an unconscious person.
HOT LINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-424-9300 for emergency medical treatment information.	
NOTE TO PHYSICIAN	
Probable mucosal damage may contraindicate the use of gastric lavage.	

Hasa, Inc.
P.O. Box 802736, Santa Clarita, CA 91355

EPA REG. NO. 10897-26

EPA EST. NO. 10897-CA-1 • 10897-CA-2 • 10897-WA-1 • 10897-WA-2 • 10897-TX-2

NET CONTENTS:

Read Entire Label Before Using This Product

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER: CORROSIVE: Causes eye damage. Harmful if swallowed or absorbed through skin. Do not get in eyes, on skin, or on clothing. Wear safety glasses, goggles, or face shield, protective clothing, and rubber gloves when handling this product. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove and wash contaminated clothing before reuse. Avoid breathing vapors. Vacate poorly ventilated areas as soon as possible. Do not return until strong odors have dissipated.

ENVIRONMENTAL HAZARDS

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

PHYSICAL AND CHEMICAL HAZARDS

STRONG OXIDIZING AGENT: Mix only with water according to label directions. Do not mix with other chemicals. Mixing this product with chemicals (e.g. ammonia, acids, detergents, etc.) or organic matter (e.g. urine, feces, etc.) will release chlorine gas, which is irritating to eyes, lungs, and mucous membranes.

STORAGE AND DISPOSAL

STORAGE: Keep this product in a tightly closed vented container, when not in use. Store in a cool, dry, well ventilated area, away from direct sunlight and heat to avoid deterioration. Do not contaminate water, food, or feed by storage, disposal, or cleaning of equipment.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility. In case of spill, flood area with large quantities of water. Product or rinsates that cannot be used should be diluted with water before disposal in a sanitary sewer.

RESIDUE REMOVAL (Prior to Disposal): Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. Triple rinse or pressure rinse container (or equivalent) promptly after emptying.

Triple Rinse: Triple rinse as follows: Empty remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times.

Pressure Rinse: Pressure rinse as follows: Empty the remaining contents into application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

CONTAINER DISPOSAL: Non-refillable container. Do not reuse or refill this container. Place in trash or offer for recycling if available.

Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Place in trash or offer for recycling if available.

DIRECTIONS FOR USE

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

Note: This product degrades with age and exposure to sunlight and heat. Use a chlorine test kit and increase dosage as necessary to obtain the required level of available chlorine.

SWIMMING POOL WATER DISINFECTION

NEW POOL OR SPRING START UP – For a new pool or spring start-up, super-chlorinate with 50 to 100 fl.oz. of this product for each 10,000 gallons of water to yield 5 to 10 ppm available chlorine by weight. Entry into treated pools is prohibited above levels of 4 ppm due to risk of bodily harm.

TESTING – Check the level of available chlorine with a test kit. Stabilized pools should maintain a residual of 1 - 4 ppm available chlorine. Adjust and maintain pool water pH between 7.2 and 7.8. Adjust and maintain the alkalinity of the pool to between 80 to 150 ppm.

MAINTENANCE – To maintain the pool, add manually or by a feeder device 11 fl.oz. of this product for each 10,000 gallons of water to yield an available chlorine residual between 0.6 to 1.0 ppm by weight. Test the pH, available chlorine residual and alkalinity of the water frequently with appropriate test kits. Frequency of water treatment will depend upon temperature and number of swimmers.

SUPER-CHLORINATION – Every 7 days, or as necessary, super-chlorinate the pool with 50 to 100 fl.oz. of this product for each 10,000 gallons of water to yield 5 to 10 ppm available chlorine by weight. Check the level of available chlorine with a test kit. Re-entry into treated pools is prohibited above levels of 4 ppm due to risk of bodily harm.

DRAINING POOL – When water is to be drained from the pool, chlorine must be allowed to dissipate from treated pool water before discharge. Do not chlorinate the pool within 24 hours prior to discharge.

WINTERIZING POOL – Thoroughly clean and vacuum the pool. While water is still clear and clean, apply 3 fl.oz. of product per 1,000 gallons, while filter and pump are operating, to obtain a 3 ppm available chlorine residual, as determined by a suitable test kit. Cover pool, prepare heater, filter and associated components for winter by following manufacturers' instructions.

ESTIMATING POOL SIZE – To estimate the number of gallons in your pool, use the appropriate formula below (Use measurements in feet only):
Rectangular Pools: Length x Width x Average Depth x 7.5
Round: Diameter x Diameter x Average Depth x 5.9
Oval: Maximum Length x Maximum Width x Average Depth x 5.9
Free Form: Surface Area (Sq. feet) x Average Depth x 7.5

DOSAGE CHART – To obtain an approximate level of available chlorine (ppm - parts per million) in the pool, add the indicated amount of this product corresponding to the capacity of the pool. Always check the level of available chlorine with a test kit to ensure efficacy.

Fluid Ounces of Product to Achieve Desired Available Chlorine Level

Desired available Chlorine Level (ppm)	Number of Gallons of Pool / Spa Water (Gallons)							
	100	500	1,000	2,500	5,000	10,000	20,000	50,000
1.0	0.1	0.5	1.0	2.5	5.0	10.0	20.0	50.0
2.0	0.2	1.0	2.0	5.0	10.0	20.0	40.0	100.0
3.0	0.3	1.5	3.0	7.5	15.0	30.0	50.0	150.0
5.0	0.5	2.5	5.0	12.5	25.0	50.0	100.0	250.0
10.0	1.0	5.0	10.0	25.0	50.0	100.0	200.0	500.0

Table of Liquid Measures:

1 Tbsp. = 3 tsp.	1 cup = 8 fl.oz.	1 qt. = 2 pt.	3.79 liters = 1 gal	128 fl.oz. = 1 gal
2 Tbsp. = 1 fl.oz.	2 cups = 1 pt.	4 qt. = 1 gal	29.57 ml = 1 fl.oz.	32 fl.oz. = 4 cups

SPAS, HOT TUBS, IMMERSION TANKS, ETC.

NEW SPA OR START UP – Apply 5 fl.oz. of product per 1,000 gallons of water to obtain a free available chlorine concentration of 5 ppm, as determined by a suitable chlorine test kit. Entry into treated spas is prohibited above levels of 5 ppm due to risk of bodily harm.

TESTING – Check the level of available chlorine with a test kit. Spas should maintain a residual of 1.5 – 5.0 ppm available chlorine. Adjust and maintain spa water pH between 7.2 and 7.8. Adjust and maintain the alkalinity of the spa between 80 to 150 ppm.

MAINTENANCE – To maintain the water, apply 5 fl.oz. of product per 1,000 gallons of water over the surface to maintain a chlorine concentration of 1.5 – 5.0 ppm. Some oils, lotions, fragrances, cleaners, etc. may cause foaming or cloudy water as well as reduce the efficiency of the product.

During extended periods of non-use, add 8 fl.oz. of this product per 500 gallons of water twice a week or as needed to maintain a 1.5 – 5.0 ppm chlorine concentration.

SUPER-CHLORINATION – After each use, shock treat with 8 fl.oz. of this product per 500 gallons of water to control odor and algae. Re-entry into treated spas is prohibited above levels of 5 ppm due to risk of bodily harm.

HUBBARD AND IMMERSION TANKS – Add 5 fl.oz. of this product per 200 gallons of water before patient use to obtain a chlorine residual of 25 ppm, as determined by a suitable test kit. Adjust and maintain the water pH to between 7.2 and 7.6. After each use, drain the tank. Add 5 fl.oz. to a bucket of water and circulate this solution through the agitator of the tank for 15 minutes and then rinse out the solution. Clean tank thoroughly and dry with clean cloths. **(NOT FOR USE IN CALIFORNIA)**.

HYDROTHERAPY TANKS – Add 1 fl.oz. of this product per 1,000 gallons of water to obtain a chlorine residual of 1 ppm, as determined by a suitable chlorine test kit. Re-entry into treated spas is prohibited above levels of 5 ppm due to risk of bodily harm. Adjust and maintain the water pH to between 7.2 and 7.6. Operate pool filter continuously. Drain pool weekly, and clean before refilling.

SANITIZATION OF NONPOROUS FOOD CONTACT SURFACES

RINSE METHOD – A 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 ensure that the available chlorine does not drop below 50 ppm. Prepare a 100 ppm sanitizing solution by thoroughly mixing 1 fl.oz. of this product with 10 gallons of water. If no test kit is available, prepare a sanitizing solution by thoroughly mixing 2 fl.oz. of this product with 10 gallons of water to provide approximately 200 ppm available chlorine by weight.

Clean equipment surfaces in the normal manner. Prior to use, rinse all 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 the solution or add sufficient product to re-establish a 200 ppm residual. Do not rinse equipment with water after treatment and do not soak equipment overnight.

Sanitizers used in automated systems may be used for general cleaning but may not be re-used for sanitizing purposes.

IMMERSION METHOD – A 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 ensure that the available chlorine does not drop below 50 ppm. Prepare a 100 ppm sanitizing solution by thoroughly mixing 1 fl.oz. of this product with 10 gallons of water. If no test kit is available, prepare a sanitizing solution by thoroughly mixing 2 fl.oz. of this product with 10 gallons of water to provide approximately 200 ppm available chlorine by weight.

Clean equipment in the normal manner. Prior to use, immerse equipment in the sanitizing solution for at least 2 minutes and allow the sanitizer to drain. If solution contains less than 50 ppm available chlorine, as determined by a suitable test kit, either discard the solution or add sufficient product to re-establish a 200 ppm residual. Do not rinse equipment with water after treatment.

Sanitizers used in automated systems may be used for general cleaning but may not be re-used for sanitizing purposes.

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 by mixing the product in a ratio of 2 fl.oz. product with 10 gallons of water. Pump solution through the system until full flow is obtained at all extremities, the system is completely filled with the sanitizer and all air is removed from the system. Close drain valves and hold under pressure for at least 2 minutes to ensure contact with all internal surfaces. Remove some cleaning solution from drain valve and test with a chlorine test kit. Repeat entire cleaning/sanitizing process if effluent contains less than 50 ppm available chlorine. Discard the first portion of milk or beverage dispensed from the equipment following sanitization.

CLEAN-IN-PLACE METHOD – Thoroughly clean equipment after use. Prepare a volume of a 200 ppm available chlorine sanitizing solution equal to 110% of volume capacity of the equipment by mixing the product in a ratio of 2 fl.oz. product with 10 gallons of water. Pump solution through the system until full flow is obtained at all extremities, the system is completely filled with the sanitizer and all air is removed from the system. Close drain valves and hold under pressure for at least 10 minutes to ensure contact with all internal surfaces. Remove some cleaning solution from drain valve and test with a chlorine test kit. Repeat entire cleaning/sanitizing process if effluent contains less than 50 ppm available chlorine. Discard the first portion of milk or beverage dispensed from the equipment following sanitization.

SPRAY/FOG METHOD – Pre-clean all surfaces after use. Use a 200 ppm available chlorine solution to control bacteria, mold or fungi and a 600 ppm solution to control bacteriophage. Prepare a 200 ppm sanitizing solution of sufficient size by thoroughly mixing the product in a ratio of 2 fl.oz. product with 10 gallons of water. Prepare a 600 ppm solution by thoroughly mixing the product in a ratio of 6 fl.oz. product with 10 gallons of water. Use spray or fogging equipment, which can resist hypochlorite solutions. Always empty and rinse spray/fog equipment with potable water after use. 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.

SANITIZATION OF POROUS FOOD CONTACT SURFACES

RINSE METHOD – Prepare a sanitizing solution by thoroughly mixing 6 fl.oz. of this product with 10 gallons of water to provide approximately 600 ppm available chlorine by weight. Clean surfaces in the normal manner. Rinse all surfaces thoroughly with the sanitizing solution, maintaining contact with the sanitizer for at least 2 minutes. Do not soak equipment overnight.

Prepare a 200 ppm sanitizing solution by thoroughly mixing 2 fl.oz. of this product with 10 gallons of water. Prior to using equipment, rinse all surfaces with a 200 ppm available chlorine solution. Do not rinse and do not soak equipment overnight.

IMMERSION METHOD – Prepare a sanitizing solution by thoroughly mixing, in an immersion tank, 6 fl.oz. of this product with 10 gallons of water to provide approximately 600 ppm available chlorine by weight. Clean equipment in the normal manner. Immerse equipment in the sanitizing solution for at least 2 minutes and allow the sanitizer to drain.

Prepare a 200 ppm sanitizing solution by thoroughly mixing 2 fl.oz. of this product with 10 gallons of water. Prior to using equipment, rinse (or immerse) all surfaces with a 200 ppm available chlorine solution. Do not rinse and do not soak equipment overnight.

SPRAY/FOG METHOD – Pre-clean all surfaces after use. Prepare a 600 ppm available chlorine sanitizing solution of sufficient size by thoroughly mixing the product in a ratio of 6 fl.oz. product with 10 gallons of water. Use spray or fogging equipment, which can resist hypochlorite solutions. Always empty and rinse spray/fog equipment with potable water after use. 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 with a 200 ppm available chlorine solution. Prepare a 200 ppm sanitizing solution by thoroughly mixing 2 fl.oz. of this product with 10 gallons of water.

SANITIZATION OF NONPOROUS NON-FOOD CONTACT SURFACES

RINSE METHOD – Prepare a sanitizing solution by thoroughly mixing 2 fl.oz. of this product with 10 gallons of water to provide approximately 200 ppm available chlorine by weight. Clean equipment surfaces in the 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 with water after treatment and do not soak equipment overnight.

IMMERSION METHOD – Prepare a sanitizing solution by thoroughly mixing, in an immersion tank, 2 fl.oz. of this product with 10 gallons of water to provide approximately 200 ppm available chlorine by weight. Clean equipment in the normal manner. Prior to use, immerse equipment in the sanitizing solution for at least 2 minutes and allow the sanitizer to drain. Do not rinse equipment with water after treatment.

SPRAY/FOG METHOD – Pre-clean all surfaces after use. Prepare a 200 ppm available chlorine sanitizing solution of sufficient size by thoroughly mixing the product in a ratio of 2 fl.oz. product with 10 gallons of water. Use spray or fogging equipment, which can resist hypochlorite solutions. Prior to using equipment, thoroughly spray or fog all surfaces until wet, allowing excess sanitizer to drain. Vacate area for at least 2 hours.

DISINFECTION OF NONPOROUS NON-FOOD CONTACT SURFACES

RINSE METHOD – Prepare a disinfecting solution by thoroughly mixing 6 fl.oz. of this product with 10 gallons of water to provide approximately 600 ppm available chlorine by weight. Clean equipment surfaces in the normal manner. Prior to use, rinse all surfaces thoroughly with the disinfecting solution, maintaining contact with the solution for at least 10 minutes. Do not rinse equipment with water after treatment and do not soak equipment overnight.

IMMERSION METHOD – Prepare a disinfecting solution by thoroughly mixing, in an immersion tank, 6 fl.oz. of this product with 10 gallons of water to provide approximately 600 ppm available chlorine by weight. Clean equipment in the normal manner. Prior to use, immerse equipment in the disinfecting solution for at least 10 minutes and allow the sanitizer to drain. Do not rinse equipment with water after treatment.

SANITIZATION OF POROUS NON-FOOD CONTACT SURFACES

RINSE METHOD – Prepare a sanitizing solution by thoroughly mixing 6 fl.oz. of this product with 10 gallons of water to provide approximately 600 ppm available chlorine by weight. Clean surfaces in the 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 with water after treatment and do not soak equipment overnight.

IMMERSION METHOD – Prepare a sanitizing solution by thoroughly mixing, in an immersion tank, 6 fl.oz. of this product with 10 gallons of water to provide approximately 600 ppm available chlorine by weight. Clean equipment in the normal manner. Prior to use, immerse equipment in the sanitizing solution for at least 2 minutes and allow the sanitizer to drain. Do not rinse equipment with water after treatment.

SPRAY/FOG METHOD – After cleaning, sanitize non-food contact surfaces with 600 ppm available chlorine by thoroughly mixing the product in a ratio of 6 fl.oz. of this product with 10 gallons of water. Use spray or fogging equipment, which can resist hypochlorite solutions. Always empty and rinse spray/fog equipment with potable water after use. Prior to using equipment, thoroughly spray or fog all surfaces until wet, allowing excess sanitizer to drain. Vacate area for at least 2 hours.

WAREWASHING

FOR SANITIZING TABLEWARE IN LOW TEMPERATURE DISHWASHING MACHINE – Dispense this product into final rinse water at 100 ppm available chlorine. Do not allow concentration to fall below 50 ppm. Air dry. Dispenser should be set to deliver a sanitizing solution of 1 fl.oz. per 10 gallons of water to provide 100 ppm of available chlorine. Only a qualified service representative should set or adjust dispenser on the machine.

SEWAGE & WASTEWATER EFFLUENT TREATMENT

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 has been 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 the chlorine residual is the critical factor in disinfection, the importance of correlating chlorine residual with bacterial kill must be emphasized. The MPN of the effluent, which is directly related to the water quality standards requirements, 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.

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 on response to fluctuating chlorine demand to maintain a predetermined, desirable chlorine level. Secondary effluent should contain 0.2 to 1 ppm chlorine residual after a 15 to 30 minutes contact time. A reasonable average of residual chlorine is 0.5 ppm after 15 minutes contact time.

SEWAGE AND WASTEWATER TREATMENT

EFFLUENT SLIME CONTROL – Apply a 100 to 1,000 ppm available chlorine solution at a location, which will allow complete mixing. Prepare this solution by mixing 10 to 100 fl.oz. of this product with 100 gallons of water. Once control is evident, apply a 15 ppm available chlorine solution. Prepare this solution by mixing 1.5 fl.oz. of this product with 100 gallons of water.

FILTER BEDS- SLIME CONTROL: Remove filter from service, drain to a depth of 1 ft. above filter sand, and add 80 fl.oz. of product per 20 sq. ft. 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 filter.

DISINFECTION OF DRINKING WATER (EMERGENCY/PUBLIC/INDIVIDUAL SYSTEMS)

PUBLIC SYSTEMS- Mix a ratio of 1 fl.oz. of this product to 100 gallons of water. Begin feeding this solution with a hypochlorinator 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 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.

INDIVIDUAL SYSTEMS: 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 fl.oz. of this product into 10 gallons of water. After covering the well, pour the sanitizing solution into the well through both the pipe sleeve opening and the pipeline. Wash the exterior of the pump cylinder also with the sanitizing solution. Start pump and pump water until strong odor of chlorine in water is noted. Stop pump and wait at least 24 hours. After 24 hours flush well until all traces of chlorine have been removed from the water. Consult your local Health Department for further details.

INDIVIDUAL WATER SYSTEMS: DRILLED, DRIVEN & BORED WELLS – Run pump until 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 fl.oz. of this product into 10 gallons of water. Add 5 to 10 gallons, of clean, chlorinated water to the well in order to force the sanitizer into the rock formation. Wash the exterior of pump cylinder with the sanitizer. Drop pipeline into well, start pump and pump water until strong odor of chlorine in water is noted. Stop 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.

INDIVIDUAL WATER SYSTEMS: FLOWING ARTESIAN WELLS – Artesian wells generally do not require disinfection. If analyses indicate persistent contamination, the well should be disinfected. Consult your local Health Department for further details.

EMERGENCY DISINFECTION – When boiling of water for 1 minute is not practical, water can be made potable by using this product. 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 drop of this product to 20 gallons of water. Allow the treated water to stand for 30 minutes. Properly treated water should have a slight chlorine odor, if 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.

PUBLIC WATER SYSTEMS

RESERVOIRS: ALGAE CONTROL – Hypochlorinate streams feeding the reservoir. Suitable feeding points should be selected on each stream at least 50 yards upstream from the points of entry into the reservoir.

MAINS – Thoroughly flush section to be sanitized by discharging from hydrants. Permit a water flow of at least 2.5 feet per minute to continue under pressure while injecting this product by means of a hypochlorinator. Stop water flow when a chlorine residual test of 50 ppm is obtained at the low pressure end of the new main section after a 24 hour retention time. When chlorination is completed, the system must be flushed free of all heavily chlorinated water.

NEW TANKS, BASINS, ETC. – Remove all physical soil from surfaces. Place 20 fl.oz. of this product for each 5 cubic feet of working capacity (500 ppm available chlorine). Fill to working capacity and allow to stand for at least 4 hours. Drain and flush with potable water and return to service.

NEW FILTER SAND – Apply 80 fl.oz. of this product 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.

NEW WELLS – Flush the casing with a 50 ppm available chlorine solution of water containing 5 fl.oz. of this product for each 100 gallons of water. The solution should be pumped or fed by gravity into the well after thorough mixing with agitation: The well should stand for several hours or overnight under chlorination. It may then be pumped until a representative raw water sample is obtained. Bacterial examination of the water will indicate whether further treatment is necessary.

EXISTING EQUIPMENT – Remove equipment from service, thoroughly clean surfaces of all physical soil. Sanitize by placing 20 fl.oz. of this product for each 5 cubic feet capacity, (approximately 500 ppm available chlorine). Fill to working capacity and let stand at least 4 hours. Drain and place in service. If the previous treatment is not practical, surfaces may be sprayed with a solution containing 5 fl.oz. of this product for each 5 gallons of water (approximately 1,000 ppm available chlorine). After drying, flush with water and return to service.

EMERGENCY DISINFECTION AFTER FLOODS

WELLS – Thoroughly flush contaminated casing with a 500 ppm available chlorine solution. Prepare this solution by mixing 5 fl.oz. of this product with 10 gallons of water. Backwash the well to increase yield and reduce turbidity, adding sufficient chlorinating solution to the backwash to produce a 10 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 hours and take a representative water sample. Retreat well if water samples are biologically unacceptable.

RESERVOIRS – In case of contamination by overflowing streams, establish hypochlorinating stations upstream of the reservoir. Chlorinate the inlet water until the entire reservoir obtains a 0.2 ppm available chlorine residual, as determined by a suitable chlorine test kit. In case of contamination from surface drainage, apply sufficient product directly to the reservoir to obtain a 0.2 ppm available chlorine residual in all parts of the reservoir.

BASINS, TANKS, FLUMES, ETC. – Thoroughly clean all equipment, then apply 20 fl.oz. of product per 5 cu. ft. 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 5 fl.oz. of this product for each 5 gallons of water (1,000 ppm available chlorine). Allow to stand for 2 to 4 hours, flush and return to service.

FILTERS – When the sand filter needs replacement; apply 80 fl.oz. of this product for each 150 to 200 cubic feet of sand. When the filter is severely contaminated, additional product should be distributed over the surface at the rate of 80 fl.oz. per 20 sq. ft. Water should stand at a depth of 1 foot above the surface of the filter bed for 4 to 24 hours. When filter beds can be backwashed of mud and silt, apply 80 fl.oz. of this product per each 50 sq. ft., allowing the water to stand at a depth of 1 foot above the filter sand. After 30 minutes, drain water to the level of the filter. After 4 to 6 hours drain, and proceed with normal back washing.

DISTRIBUTION SYSTEM – Flush 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.

EMERGENCY DISINFECTION AFTER FIRES

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 to give a chlorine residual of at least 0.1 to 0.2 ppm at the point where the untreated supply enters the regular distribution system. Use a chlorine test kit.

EMERGENCY DISINFECTION AFTER DROUGHTS

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 20 minute contact time. Use a chlorine test kit.

WATER SHIPPED IN BY TANKS, TANK CARS, TRUCKS, ETC. – Thoroughly clean all containers and equipment. Spray a 500 ppm available chlorine solution and rinse with potable water after 5 minutes. This solution is made by mixing 5 fl.oz. of this product for each 10 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.

EMERGENCY DISINFECTION AFTER MAIN BREAKS

MAINS – Before assembly of the repaired section, flush out mud and soil. Permit a water flow of at least 2.5 feet per minute to continue under pressure while injecting this product by means of a hypochlorinator. Stop water flow when a chlorine residual test of 50 ppm is obtained at the low pressure end of the new main section after a 24 hour retention time. When chlorination is completed, the system must be flushed free of all heavily chlorinated water.

COOLING TOWER/ EVAPORATIVE CONDENSER WATER

SLUG FEED METHOD – Initial Dose: When system is noticeably fouled, apply 50 to 100 fl.oz. of this product per 10,000 gallons of water in the system to obtain from 5 to 10 ppm available chlorine. Repeat until control is achieved.

Subsequent Dose: When microbial control is evident, add 10 fl.oz. of this product per 10,000 gallons of water in the system daily, or as needed to maintain control and keep the chlorine residual at 1 ppm. Badly fouled systems must be cleaned before treatment is begun.

INTERMITTENT FEED METHOD – Initial Dose: When system is noticeably fouled, apply 50 to 100 fl.oz. of this product per 10,000 gallons of water in the system to obtain 5 to 10 ppm available chlorine. Apply half (or 1/3, 1/4, or 1/5) of this initial dose when half (or 1/3, 1/4, or 1/5) of the water in the system has been lost by blowdown.

Subsequent Dose: When microbial control is evident, add 10 fl.oz. of this product per 10,000 gallons of water in the system to obtain a 1 ppm residual. Apply half (or 1/3, 1/4, or 1/5) of this initial dose when half (or 1/3, 1/4, or 1/5) of the water in the system has been lost by blowdown. Badly fouled systems must be cleaned before treatment is begun.

CONTINUOUS FEED METHOD – Initial Dose: When system is noticeably fouled, apply 50 to 100 fl.oz. of this product per 10,000 gallons of water in the system to obtain 5 to 10 ppm available chlorine.

Subsequent Dose: Maintain this treatment level by starting a continuous feed of 1 fl.oz. of this product per 1,000 gallons of water lost by blowdown to maintain a 1 ppm residual. Badly fouled systems must be cleaned before treatment is begun.

LAUNDRY SANITIZERS

Household Laundry Sanitizers

IN SOAKING SUDS – Thoroughly mix 2 fl.oz. of this product to 10 gallons of wash water to provide 200 ppm available chlorine. Wait 5 minutes, then add soap or detergent. Immerse laundry for at least 11 minutes prior to starting the wash/rinse cycle.

IN WASHING SUDS – Thoroughly mix 2 fl.oz. of this product to 10 gallons of wash water containing clothes to provide 200 ppm available chlorine. Wait 5 minutes then add soap or detergent and start the wash/rinse cycle.

Commercial Laundry Sanitizers

Wet fabrics or clothes should be spun dry prior to sanitization. Thoroughly mix 2 fl.oz. of this product with 10 gallons of water to yield 200 ppm available chlorine. Promptly after mixing the sanitizer, add the solution into the prewash prior to washing fabrics/clothes in the regular wash cycle with a good detergent. Test the level of available chlorine, if solution has been allowed to stand. Add more of this product if the available chlorine level has dropped below 200 ppm.

FARM PREMISES

Remove all animals, poultry, and feed from premises, vehicles, and enclosures. Remove all litter and manure from floors, walls and surfaces of barns, pens, stalls, chutes and other facilities occupied or transversed by animals or poultry. Empty all troughs, racks and other feeding and watering appliances. Thoroughly clean all surfaces with soap or detergent and rinse with water. To disinfect, saturate all surfaces with a solution of at least 1,000 ppm available chlorine for a period of 10 minutes. A 1,000 ppm solution can be made by thoroughly mixing 10 fl.oz. of this product with 10 gallons of water. Immerse all halters, ropes and other types of equipment used in handling and restraining animals or poultry, as well as the cleaned forks, shovels, and scrapers used for removing litter and manure. Ventilate buildings, cars, boats and other closed spaces. Do not house livestock or poultry or employ equipment until chlorine has been dissipated. All treated feed racks, mangers, troughs, automatic feeders, fountains and waterers must be rinsed with potable water before reuse.

PULP AND PAPER MILL PROCESS WATER SYSTEMS

SLUG FEED METHOD – Initial Dose: When system is noticeably fouled, apply 50 to 100 fl.oz. of this product per 10,000 gallons of water in the system to obtain from 5 to 10 ppm available chlorine. Repeat until control is achieved.

Subsequent Dose: When microbial control is evident, add 10 fl.oz. of this product per 10,000 gallons of water in the system daily, or as needed to maintain control and keep the chlorine residual at 1 ppm. Badly fouled systems must be cleaned before treatment is begun.

INTERMITTENT FEED METHOD – Initial Dose: When system is noticeably fouled, apply 50 to 100 fl.oz. of this product per 10,000 gallons of water in the system to obtain 5 to 10 ppm available chlorine. Apply half (or 1/3, 1/4, or 1/5) of this initial dose when half (or 1/3, 1/4, or 1/5) of the water in the system has been lost by blowdown.

Subsequent Dose: When microbial control is evident, add 10 fl.oz. of this product per 10,000 gallons of water in the system to obtain a 1 ppm residual. Apply half (or 1/3, 1/4, or 1/5) of this initial dose when half (or 1/3, 1/4, or 1/5) of the water in the system has been lost by blowdown. Badly fouled systems must be cleaned before treatment is begun.

CONTINUOUS FEED METHOD – Initial Dose: When system is noticeably fouled, apply 50 to 100 fl.oz. of this product per 10,000 gallons of water in the system to obtain 5 to 10 ppm available chlorine.

Subsequent Dose: Maintain this treatment level by starting a continuous feed of 1 fl.oz. of this product per 1,000 gallons of water lost by blowdown to maintain a 1 ppm residual. Badly fouled systems must be cleaned before treatment is begun.

AGRICULTURAL USES

BEE CELLS & BOARDS – Disinfect leaf cutting bee cells and bee boards by immersion in a solution containing 1 ppm available chlorine for 3 minutes. Allow cells to drain for 2 minutes and dry for 4 to 5 hours or until no chlorine odor can be detected. This solution is made by thoroughly mixing 1 Tbsp. of this product to 100 gallons of water. The bee domicile is disinfected by spraying with a 0.1 ppm solution until all surfaces are thoroughly wet. Allow the domicile to dry until all chlorine odor has dissipated.

FOOD EGG SANITIZATION – Thoroughly clean all eggs. Thoroughly mix 2 fl.oz. of this product with 10 gallons of warm water to produce a 200 ppm available chlorine solution. The sanitizer temperature should not exceed 130° degrees F. Spray the warm sanitizer so that the eggs are thoroughly wetted. Allow the eggs to thoroughly dry before casing or breaking. Do not apply a potable water rinse. The solution should not be re-used to sanitize eggs.

FRUIT & VEGETABLE WASHING – Thoroughly clean all fruits and vegetables in a wash tank. Thoroughly mix 5 fl.oz. of this product in 200 gallons of water to make a sanitizing solution of 25 ppm available chlorine. After draining the tank, submerge fruit or vegetables for 2 minutes in a second wash tank containing the recirculating sanitizing solution. Spray rinse vegetables with the sanitizing solution prior to packaging. Rinse fruit with potable water only prior to packaging.

POST-HARVEST PROTECTION – Use this product to control organisms causing decay of fruits and vegetables after harvest. Prior to use, all fruits and vegetables must be thoroughly washed using an appropriate cleaning solution. Remove all soils and other residues prior to treating with this product. After washing transfer the fruits and vegetables to a separate tank containing the treatment solution.

Apply at the recommended concentration of available chlorine for various fruits and vegetables as listed in the table below. To obtain a 100 ppm solution of available chlorine, add 20 fl.oz. of this product to 200 gallons of water. Maintain the pH of the solution between 6.0 and 8.0 with a dilute solution of hydrochloric acid or other approved buffer. For other ppm concentrations, use appropriate dilutions. Rinse with potable water after treatment, except as specified in the table.

For citrus canker quarantine, use at 200 ppm at pH 6.0 to 7.5. Apply for two minutes using a suitable spray or dip tank treatment.

Potato Sanitization: Potatoes can be sanitized after cleaning and prior to storage by spraying with a sanitizing solution at a level of 1 gallon of sanitizing solution per ton of potatoes. Thoroughly mix 1 fl.oz. of this product to 2 gallons of water to obtain 500 ppm available chlorine.

RICE SEED TREATMENT – To aid in surface sterilization of rice seed for prevention of bakanae disease Fusarium fukikuroi [syn. F. moniliforme] or Gibberella fujikuroi. Mix 2.5 gallons of this product per 100 gallons of water to make a 3,000 ppm available chlorine solution. Mix solution thoroughly and then immerse seeds in the solution. Allow the seeds to soak for two hours, then drain solution and replace with fresh water. Continue seed soaking and draining as usual. Do not apply undiluted product directly to seed.

Alternatively, make a 1,500 ppm available chlorine solution by mixing 1.3 gallons of this product with 100 gallons of water. Mix solution thoroughly and then immerse seeds in the solution. Soak and drain seed as usual. No rinsing is required. Do not apply undiluted product directly to seed.

Prepare a fresh solution for each batch of seed. Do not use treated seeds for food or feed.

MEAT & POULTRY PLANTS – This product may be used in processing water of meat and poultry plants at concentrations up to 5 ppm calculated as available chlorine. Chlorine may be present in poultry chiller intake water, and in carcass wash water at concentrations up to 50 ppm calculated as available chlorine. Use a suitable test kit to adjust to desired available chlorine level. Chlorine must be dispensed at a constant and uniform level and the method or system must be such that a controlled rate is maintained. Thoroughly mix 1 fl.oz. of this product to 200 gallons of water to obtain 5 ppm available chlorine or 10 fl.oz. to 200 gallons of water for 50 ppm available chlorine.

AQUACULTURAL USES

FISH PONDS – Remove fish from ponds prior to treatment. Thoroughly mix 100 fl.oz. of this product to 10,000 gallons of water to obtain 10 ppm available chlorine. Add more product to the water if the available chlorine level is below 1 ppm after 5 minutes. Return fish to pond after the available chlorine level reaches zero.

FISH POND EQUIPMENT – Thoroughly clean all equipment prior to treatment. Thoroughly mix 2 fl.oz. of this product to 10 gallons of water to obtain 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. Thoroughly mix 6,000 fl.oz. (47 gallons) of this product to 10,000 gallons of water to obtain at least 600 ppm available chlorine. Apply so that all barrows, gates, rock and dam are treated with product. Permit high tide to fill the pond and then close the 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 pond. **(NOT FOR USE IN CALIFORNIA)**

CONDITIONING LIVE OYSTERS – Thoroughly mix 5 fl.oz. of this product to 10,000 gallons of water at 50° to 70° degree F to obtain 0.5 ppm available chlorine. Expose oysters to this solution for at least 15 minutes, monitoring the available chlorine level so that it does not fall below 0.05 ppm. Repeat entire process if the available chlorine level drops below 0.05 ppm or the temperature falls below 50° degree F. **(NOT FOR USE IN CALIFORNIA)**

CONTROL OF SCAVENGERS IN FISH HATCHERY PONDS – Prepare a solution containing 200 ppm of available chlorine by mixing 2 fl.oz. of product with 10 gallons of water. Pour into drained pond potholes. Repeat if necessary. Do not put desirable fish back into refilled ponds until chlorine residual has dropped to 0 ppm as determined by a test kit.

SANITIZATION OF DIALYSIS MACHINES

Flush equipment thoroughly with water prior to using this product. Thoroughly mix 6 fl.oz. of this product to 10 gallons of water to obtain at least 600 ppm available chlorine. Immediately use this product in the hemodialysate system allowing for a minimum contact time of 15 minutes at 20° degree C. Drain system of the sanitizing solution and thoroughly rinse with water. Discard and **DO NOT** reuse the spent sanitizer. Rinsate must be monitored with a suitable test kit to ensure that no available chlorine remains in the system.

This product is recommended for decontaminating single and multi-patient hemodialysate systems. This product has been shown to be an effective disinfectant (virucide, fungicide, bactericide, pseudomonicide) when tested by AOAC and EPA Test methods. This product may not totally eliminate all vegetative microorganisms in hemodialysate delivery systems due to their construction and/or assembly, but can be relied upon to reduce the number of microorganisms to acceptable levels when used as directed. This product should be used in a disinfectant program, which includes bacteriological monitoring of the hemodialysate delivery system. This product is NOT recommended for use in hemodialysate or reverse osmosis (RO) membranes.

Consult the guidelines for hemodialysate systems, which are available from the Hepatitis Laboratories, CDC, Phoenix, AZ 85021.

ASPHALT OR WOOD ROOFS AND SIDINGS (NOT FOR USE IN CALIFORNIA)

To control fungus and mildew, first remove all physical soil by brushing and hosing with clean water, and apply a 5,000 ppm available chlorine solution. Mix 5 fl.oz. of this product per gallon of water and brush or spray roof or siding. After 30 minutes, rinse by hosing with clean water.

BOAT BOTTOMS

To control slime on boat bottoms, sling a plastic tarp under boat, retaining enough water to cover the fouled bottom area, but not allowing water to enter enclosed area. This envelope should contain approximately 500 gallons of water for a 14 foot boat. Add 18 fl.oz. of this product to this water to obtain a 35 ppm available chlorine concentration. Leave immersed 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 suitable test kit.

ARTIFICIAL SAND BEACHES (NOT FOR USE IN CALIFORNIA)

To sanitize the sand, spray a 500 ppm available chlorine solution containing 5 fl.oz. of this product per 10 gallons of water at frequent intervals. Small areas can be sprinkled with a watering can.

IRRIGATION SYSTEMS

This product when used properly will control bacterial and algae growth in irrigation water systems, and thereby provide a uniform distribution of water. This product may be applied through irrigation systems such as: sprinkler, including center pivot, lateral move, end tow, side (wheel) roll, traveler, big gun, solid set, or hand move; flood (basin); furrow; border or drip (trickle) or subsurface irrigation systems. Other irrigation systems not listed may be used upon approval or recommendation from the State agency responsible for pesticide regulation, or an authority designated by the pesticide regulatory agency.

GENERAL – Do not contaminate ground water or expose humans or animals by the use of irrigation systems to apply pesticide chemicals.

Any chemigation system must include mechanical devices and/or design features adequate to protect the irrigation source water and the general environment from pesticide contamination due to equipment failure, malfunctions or accidents. Such devices or design features must be approved or recommended by the State agency responsible for pesticide regulation, or recommended/approved by an authority designated by the pesticide regulatory agency.

Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system unless safety devices or protective measures for preventing contamination of public water systems are in place. Such devices or protective measures must be approved or recommended by the State agency responsible for pesticide regulation, or recommended/approved by an authority designated by the pesticide regulatory agency.

A person knowledgeable of the chemigation/irrigation system and responsible for its operation or under the supervision of the responsible person, must shut the system down and make necessary adjustments, should the need arise.

Some state pesticide agencies may require a person operating a chemigation system to obtain and possess pesticide applicator certification or a license to operate such a system. It is the responsibility of the operator of the chemigation system to determine if certification or licensing is required.

CALIBRATION – If the irrigation water has high levels of nutrients causing bacterial, algae, and other biofouling that reduces system performance, continuous chlorination may be necessary. The recommended level of free residual chlorine for continuous feed is 1 to 2 ppm, measured at the end of the farthest lateral using a good quality test kit for available chlorine. The available chlorine level should be checked periodically. If you have questions about calibration or other technical aspects, you should contact State Extension Service specialists, the equipment manufacturer or other experts.

SHOCK TREATMENTS – Periodic shock treatments at a higher available chlorine rate of up to 20 ppm free residual may be appropriate where bacteria and/or algae clogging and build-up are not managed by maintaining a continuous residual. The frequency of the chlorine shock application depends upon the frequency and extent of bio-clogging.

INJECTION – The rate of sanitizer injection into the irrigation water flow required to supply the desired available chlorine dosage in ppm can be estimated using the following equation:

I = (0.006) x (ppm desired) x (system flow rate in gpm) / (bleach strength)

Where I is the injection rate in gallons per hour.

For example: To obtain 5 ppm available chlorine at a water flow rate of 30 gallons per minute while injecting 12.5% sodium hypochlorite solution, you should inject:

I = (0.006) x (5) x (30) / 12.5 = 0.072 gallons per hour of 12.5% sodium hypochlorite solution.

NOTE: This calculation, when applied to clean water, which is free of amine nitrogen and organic nutrients, will give a result close to the actual product injection rate required. In actual practice, however, contaminants in the water may consume sanitizer such that the available chlorine concentration is less than expected from the calculation. To correctly establish the product dose setting required, it is necessary to measure the available chlorine at the end of the treated increment in the field and adjust the sanitizer dose setting until the desired available chlorine concentration is obtained. Only experience can establish the actual injector settings required to provide the desired level of available chlorine at the end of the farthest lateral.

Injection should be started during irrigation, near the end of the irrigation sequence, but early enough to establish the desired available chlorine concentration throughout the system being treated. Apply the sanitizer upstream of the filter to help keep the filter clean. Determine the level of available chlorine as described in the "Calibration" section, above, using a chlorine test kit. Allow sufficient time to achieve a steady reading.

DO NOT apply sanitizer when fertilizers, herbicides, and insecticides are being injected since they will consume the available chlorine and may produce toxic reaction products.

SENSITIVE PLANT SPECIES PRECAUTIONS – Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from non-uniform distribution of treated water. Certain plants, including various species of trees, flowers, shrubs, agronomic crops, fruits and vegetables are adversely affected by chlorinated irrigation. The use of this product can impact the growth, appearance, and health of the plants.

Begonias, geraniums and other ornamental plant species are known to be sensitive to continuous chlorination at levels of 1-2 ppm free chlorine. Plant species such as tomato, lettuce, broccoli, and petunia are sensitive to periodic chlorination levels of 10-20 ppm free chlorine.

If uncertain of a plant's tolerance, consult an agronomist or a support agency such as a University Extension Service or your local agent of the U.S. Department of Agriculture.

CHLORINE DOSAGE FOR POST-HARVEST PROTECTION OF FRUITS AND VEGETABLES

Available Chlorine Required in Treatment Water

COMMODITY	TREATMENT METHOD	AVAILABLE CHLORINE TO APPLY (ppm)	COMMENTS
Apples	Dump Tank Flume Spray	100 – 500 30 – 50 100 – 200	Submerge the apples for a minimum of 45 seconds. Do not exceed 90 seconds contact time in dump tank or flume. Spray until thoroughly wet.
Artichokes	Spray	100 – 150	Spray until thoroughly wet.
Asparagus	Spray Hydrocooler	100 – 150 125 – 150	Spray until thoroughly wet. Hydrocool for 20 – 30 minutes.
Brussels Sprouts	Spray	100 – 150	Spray until thoroughly wet.
Cabbage (Chopped)	Spray	80 – 100	Spray until thoroughly wet. After treatment, the adhering moisture must be removed by centrifuging.
Carrots	Dump Tank Flume Spray	100 – 200 100 – 200 50 – 100	Remove the carrots from dump tank or flume after 1 – 5 minutes contact time. Spray until thoroughly wet.
Cauliflower	Spray	300 – 400	Spray until thoroughly wet.
Celery	Spray	100 – 110	Spray until thoroughly wet.
Cherries	Spray	75 – 100	Spray until thoroughly wet.
Cucumbers	Spray	300 – 350	Spray until thoroughly wet.
Garlic	Spray Tank	75 – 100 75 – 150	Spray until thoroughly wet. Remove from tank after 2 – 5 minutes contact.
Grapefruits	Spray Drench	100 – 150 40 – 75	Spray until thoroughly wet. Drench for 3 – 5 minutes. For citrus quarantine treatment, use 200 ppm of available chlorine at pH 6.0 – 7.5 in drench tank.
Lemons	Spray Drench Dump Tank	100 – 150 40 – 75 30 – 50	Spray until thoroughly wet. Drench for 3 – 5 minutes. Remove from tank after 2 – 3 minutes contact time.
Lettuce (Whole leaf, shredded, chopped, or baby greens)	Spray Drench Dump Tank / Hydrocooler	100 - 150 50 - 150 50 - 150	Thoroughly wet lettuce. After treatment, the adhering moisture must be removed by centrifuging. Potable water rinse is not required.
Melons (All varieties)	Hydrocooler Spray	100 – 150 100 – 150	Hydrocool for 20 – 30 minutes. Spray until thoroughly wet.
Mushrooms	Spray	100 – 120	After treatment with the chlorinated water, mushrooms must be treated with 0.2% sodium bisulfate (anti-oxidant) to prevent browning.

CHLORINE DOSAGE FOR POST-HARVEST PROTECTION OF FRUITS AND VEGETABLES

Available Chlorine Required in Treatment Water

COMMODITY	TREATMENT METHOD	AVAILABLE CHLORINE TO APPLY (ppm)	COMMENTS
Nectarines	Hydrocooler Spray	30 – 75 50 – 100	Hydrocool for 20 -30 minutes. Spray until thoroughly wet.
Onion (Dry)	Spray Tank	75 – 120 75 – 120	Spray until thoroughly wet. Remove from tank after 2 – 3 minutes contact time.
Onions (Green)	Spray	75 – 120	Spray until thoroughly wet.
Oranges	Drench Spray	20 – 30 20 – 30	Drench for 3 – 5 minutes. Spray until thoroughly wet.
Peaches	Hydrocooler Spray	30 – 75 50 – 100	Hydrocool for 20 – 30 minutes. Spray until thoroughly wet.
Pears	Dump Tank	200 – 300	Remove from tank after 2 – 3 minutes contact time.
Peppers	Spray	300 – 400	Spray until thoroughly wet.
Pineapples	Spray Drench Dump Tank	100 – 150 40 – 100 30 – 100	Spray until thoroughly wet. Drench for 3 – 5 minutes. Remove from tank after 2 – 3 minutes contact time. Potable water rinse is not required for pineapple.
Plums	Hydrocooler Spray	30 – 75 50 – 100	Hydrocool for 20 – 30 minutes. Spray until thoroughly wet.
Potatoes	Dump Tank Flume Spray	65 – 125	Remove from tank and flume after 2 – 5 minutes contact time. Spray until thoroughly wet.
Potatoes (White)	Spray	65 – 125	This concentration of chlorine should be used only if bleaching of potatoes is desirable. Spray until thoroughly wet on cleaned potatoes.
Radishes	Spray Tank	100 – 150 10 – 25	Spray until thoroughly wet. Remove from tank after 1-1.2 minutes contact time.
Spinach	Spray	75 – 150	Spray until thoroughly wet.
Stone Fruit	Hydrocooler	30 – 75	Hydrocool for 20 – 30 minutes.
Tomatoes	Tank Spray	300 – 350 100 – 150	Remove after 2 – 3 minutes of contact time in the tank. Spray until thoroughly wet.
Yams	Tank	100 – 200	Remove after 2 – 3 minutes of contact time in the tank.

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