

Swimming Pool Water Disinfection

"For a new pool or spring start-up superchlorinate with 10 to 20 oz. of product for each 10,000 gallons of water to yield 5 to 10 ppm available Chlorine. Check the level of available Chlorine with a test kit. Adjust and maintain pool water pH between 7.2 to 7.6. To maintain the pool, add manually or by a feeder device 2 oz. of this product for each 10,000 gallons of water to yield available Chlorine residual between 0.6 to 1.0 ppm by weight. Stabilized pools should maintain a residual of 1.0 to 1.5 ppm available Chlorine. 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.

Every 7 days, or as necessary Superchlorinate the pool with 10 to 20 oz. of product for each 10,000 gallons of water to yield 5 to 10 ppm available Chlorine. Check the level of available Chlorine with test kit. Do not re-enter pool until the Chlorine residual is between 1.0 to 3.0 ppm. At the end of the swimming pool season or 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 Pools $\frac{1}{2}$ While water is still clear & clean, apply 0.6 oz. of product per 1000 gallons while filter is running, to obtain a 3 ppm available Chlorine residual as determined by a suitable test kit. Cover pool, prepare heater, filter and heater components for winter by following manufacturer's instructions.

Spas, Hot-Tubs, Immersion Tanks Etc.

Spas / Hot Tubs - Apply 0.5 oz. of product per 500 gallons of water to obtain a free available Chlorine concentration of 5 ppm as determined by a suitable Chlorine test kit. Adjust and maintain pool water pH between 7.2 and 7.8. Some oils, lotions, fragrances, cleaners etc. may cause foaming or cloud water as well as reduce the efficiency of the product.

To maintain the water, apply 0.5 oz. of product in 500 gallons over the surface to maintain a Chlorine concentration of 5 ppm. After each use, shock treat with 1.5 oz of this product per 500 gallons of water to control odor and algae.

During extended periods of disuse, add 1.5 oz. of this product daily per 500 gallons of water to maintain a 3 ppm Chlorine concentration.

Hydrotherapy Tanks -Add 1 oz. of this product per 1000 gallons of water to obtain a Chlorine residual of 1 ppm as determined by suitable Chlorine test kit. Pools should not be entered until the Chlorine residual is below 3 ppm. 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 $\frac{1}{2}$ A solution of 100 ppm available Chlorine may be used in 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 oz. of this product with 40 gallons of water. If no test kit is available prepare a sanitizing solution by thoroughly mixing 1 oz. of this product with 20 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 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 $\frac{1}{2}$ 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 oz. of this product with 40 gallons of water. If no test kit is available prepare a sanitizing solution by thoroughly mixing 1 oz. of this product with 20 gallons of water to provide approximately 200 ppm available Chlorine 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 $\frac{1}{2}$ 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 ration of 1 oz. product with 20 gallons of water. Pump solution through the system until full flow is obtained at all extremities, the system is completely filled with sanitizer and all air 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 $\frac{1}{2}$ sanitizing process if effluent contains less than 50 ppm available Chlorine.

Clean-in-place method $\frac{1}{2}$ Thoroughly clean equipment after use. Prepare a volume of 200 ppm available Chlorine sanitizing solution equal to 110% of volume capacity of the equipment by mixing the product in a ration of 1 oz. Product with 20 gallons of water. Pump solution through the system until full flow is obtained at all extremities, the system is completely filled with sanitizer and all air 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.

Spray/Fog method $\frac{1}{2}$ 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 1 oz. product with 20 gallons of water. Prepare a 600 ppm solution by thoroughly mixing the product in a ratio of 3 oz. product with 20 gallons of water. Use spray or fogging equipment that 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 200 ppm available solution with a 200 ppm solution. Sanitization of porous food contact surfaces

Rinse methods $\frac{1}{2}$ Prepare a 600 ppm solution by thoroughly mixing 3 oz. of this product with 20 gallons of water. Clean surfaces in the normal manner. Rinse all surface thoroughly with the 600 ppm solution, maintaining contact for at least 2 minutes. Prepare a 200 ppm sanitizing solution by thoroughly mixing 1 oz. of this product with 20 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 $\frac{1}{2}$ Prepare a 600 ppm solution by thoroughly mixing, in an immersion tank, 3 oz. of this product with 20 gallons of water. Clean equipment in the normal manner. Prepare a 200 ppm sanitizing solution by thoroughly mixing 1 oz. of this product with 20 gallons of water. Prior to using, immerse equipment in the 200 ppm sanitizing solution for at least 2 minutes and allow the sanitizer to drain. Do not rinse and do not soak equipment overnight.

Sanitization of nonporous non food contact methods

Spray/Fog method $\frac{1}{2}$ Pre-clean all surfaces after use. Prepare a 600 ppm available Chlorine sanitizing of sufficient size by thoroughly mixing the product in a ratio of 2 oz. product with 20 gallons of water. Use spray or fogging equipment that 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 1 oz. of this product with 20 gallons of water. Sanitization of nonporous non-food contact surfaces

Rinse method $\frac{1}{2}$ Prepare a sanitizing solution by thoroughly mixing 1 oz. of this product with 20 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.

Immersion method $\frac{1}{2}$ Prepare a sanitizing solution by thoroughly mixing, in an immersion tank, 1 oz. of this product with 20 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 $\frac{1}{2}$ Pre-clean all surfaces after use. Prepare 200 ppm available Chlorine sanitizing solution of sufficient size by thoroughly mixing the product in a ratio of 1 oz. product with 20 gallons of water. Use spray or fogging equipment that can resist hypochlorite solutions. Prior to using equipment, thoroughly spray or fog all surfaces until wet, allowing 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

Sanitization of nonporous non food contact surfaces

Rinse method $\frac{1}{2}$ Prepare a disinfecting solution by thoroughly mixing 3 oz. of this product with 20 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 disinfection 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 $\frac{1}{2}$ Prepare a disinfecting solution by thoroughly mixing, in an immersion tank, 3 oz. of this product with 20 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.

Spray/Fog method - After cleaning, sanitize non-food contact surfaces with 600 ppm available Chlorine by thoroughly mixing the product in a ratio of 3 oz. of this product with 20 gallons of water. Use spray or fogging equipment that 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.)

Sewage and wastewater effluent treatment The disinfection of sewage effluent must be evaluated by determining the total number of coliform bacteria and / or faecal coliform bacteria, as determined by the Most Probable Number (MPN) procedure, if the chlorinated effluent has been reduced to or below the maximum permitted by the controlling 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.

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

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

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 1.00 ppm Chlorine residual after 15 to 30 minute contact time. A reasonable average of residual Chlorine is 0.5 ppm.

Sewage and wastewater treatment

Effluent Slime Control - Apply a 100 to 1000 ppm available chlorine solution at a location which will allow complete mixing. Prepare this solution by mixing 2 to 20 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 0.3 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 16 oz. of product per 20 sq. ft. evenly over the surface. Wait 30 minutes before draining to a level that even with the top of the filter. Wait for 4 to 6 hours before completely draining and backwashing filter.