

SHOCK CHLORINATING SMALL WATER SYSTEMS

Sanitary water system components (well, pump, pipes, tanks and treatment equipment) are essential to a hygienic drinking water supply. A properly designed well and water distribution system incorporates sanitary features that keep contamination from entering under normal operating conditions, but there are occasions when contaminants will get in. During well construction, or when pumps and other water system components are being installed, soil, grease, and other foreign materials that carry bacteria adhere to interior surfaces or the equipment. To combat disease causing bacteria and viruses that remain in a water system following construction, repair or maintenance some means of disinfecting the interior surfaces is necessary. Shock chlorinating is a convenient method for doing this through the use of a concentrated chlorine solution.

Shock chlorinating is **not** a continuous process and it cannot protect a water system from continuous entry of contaminants. Only water systems that are protected against further contamination will benefit from shock chlorinating. Improperly designed or deteriorated water system components should be repaired or replaced, then shock chlorinated. Shock chlorinating uses chlorine concentrations ranging from 50 to 200 ppm, and the primary purpose is to sanitize wells, piping and other equipment which the water passes through.

Control of nuisance organisms that can live in a water system is another use for shock chlorination. Iron bacteria, for example, is not known to cause disease, but it can thrive in some iron bearing waters and forms large amounts of rust colored slime that clogs wells, pipelines, and water filters. Iron bacteria is extremely difficult to eliminate from a water system, but can be controlled with periodic shock chlorination.

HOW TO SHOCK CHLORINATE

Liquids and water-soluble powders, containing various amounts of chlorine compounds are commercially available. Tables 1 and 2 indicate approximately how much HTH or bleach is needed to yield a chlorine concentration of 200 ppm in wells of various depths and diameters. Water containing substantial amounts of iron, hydrogen sulfide, and organic material may require more chemicals because these substances deplete chlorine.

**TABLE 1
POUNDS OF HTH NEEDED TO SHOCK CHLORINATE
WELLS OF VARIOUS DEPTHS AND DIAMETERS.**

Well water Depth (ft.)	Well Diameter (inches)							
	4	6	8	12	18	24	30	36
25	0.04	0.09	0.16	0.35	0.8	1.4	2.2	3.2
50	0.08	0.18	0.31	0.7	1.6	2.8	4.4	6.4
75	0.12	0.26	.47	1.1	2.4	4.2	6.6	9.5
100	0.16	0.35	0.6	1.4	3.2	5.6	8.8	12.7
125	0.20	0.44	0.8	1.8	4.0	7.1	11.0	15.9
150	0.24	0.5	0.9	2.1	4.8	8.5	13.2	19.1
200	0.31	0.7	1.3	2.8	6.4	11.3	17.6	25.4
250	0.39	0.9	1.6	3.5	7.9	14.1	22.1	31.8
300	0.47	1.1	1.9	4.2	9.5	16.9	26.6	38.1
350	0.5	1.2	2.2	4.9	11.1	19.8	30.9	44.5
400	0.6	1.4	2.5	5.6	12.7	22.6	35.3	50.8
450	0.7	1.6	2.8	6.4	14.3	25.4	39.7	57.2
500	0.8	1.8	3.1	7.1	15.9	28.2	44.1	63.5

TABLE 2
PINTS OF BLEACH NEEDED TO SHOCK CHLORINATE WELLS
OF VARIOUS DEPTHS AND DIAMETERS.

Well Water Depth (ft.)	Well Diameter (inches)							
	4	6	8	12	18	24	30	36
25	0.5	1.2	2.1	4.7	10.6	18.8	29.3	42.2
50	1.0	2.3	4.2	9.4	21.1	37.5	58.7	
75	1.6	3.5	6.3	14.1	31.7	56.3		
100	2.1	4.7	8.3	18.8	42.2	75.1		
150	3.1	7.0	12.5	28.2	52.8			
175	3.7	8.2	14.6	32.9	73.9			
200	4.2	9.4	16.7	37.5				
250	5.2	11.7	20.9	46.9				
300	6.3	14.1	25.0	56.3				
350	7.3	16.4	29.2	65.7				
400	8.3	18.8	33.4	75.1				
450	9.4	21.1	37.5	75.1				
500	10.4	23.5	41.7					

PROCEDURE

1. To avoid adding more contaminants to the well, clean up the work area around the top of the well.
2. Wash pumping equipment and piping with ½ cup laundry bleach in 5 gallons of water, as it is lowered into the well.
3. Liquid bleaches can be poured directly in according to the charts. **See caution.**
4. Powdered Sources – Mix the required amount of dry compound with a small amount of water and stir to dissolve. Let non-dissolved particles settle and use the clear chlorine solution to disinfect the well. **See caution.**
5. Drain water heaters so chlorinated water can sanitize. Take off carbon and charcoal filters because the chlorine solution will deplete capacity. Backwash water softener.
6. Open the faucets and hydrants on each waterline, one by one, and allow water to flow until a strong chlorine odor is detected. If a strong odor is not detected, add more chlorine to the well. This is necessary if the water contains substantial amounts of iron, hydrogen sulfide, or organic material.
7. Allow the chlorine to remain in the water system for at least 2-3 hours.
8. Before using the system, thoroughly flush the remaining chlorine from the system.
9. Retest the water in about 2-3 days after disinfecting. Wait for satisfactory results before drinking. If water system continues to show contamination it may be necessary to hire a well driller or plumber to locate the problem.

USE CAUTION – All concentrated chlorine solutions are corrosive and care should be taken to avoid splashing them onto skin or into eyes. Rubber gloves, goggles, and protective apron are recommended when handling chlorine solutions. Skin areas contacted by solution should be flushed immediately with clean water. Never mix chlorine solutions with compounds containing acids or ammonia, toxic gasses will be formed.

****Reference: Cooperative Extension Service, Iowa State University, Ames, IA, Reprinted September 1993.**