State of Connecticut
Department of Public Health
Drinking Water Division

Keeping Connecticut Healthy
www.dph.state.ct.us

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Commissioner J. Robert Galvin, M.D., M.P.H.

Disinfection of a Well Water Supply

INTRODUCTION:

All new or repaired wells should be disinfected prior to use of the water system. A water system should also be disinfected following plumbing repairs or modifications, as internal piping may have been exposed to contamination.

In case of a new well, it is helpful that there be coordination between the well driller and pump installer and the contractor-plumber (if applicable). In this way, the disinfection can be combined with pressure and leakage tests of the entire water system; and the required bacteriological test for assuring safety of the drinking water supply can be performed at the same time. The chance of contamination is less likely to occur if there is no long delay between the time the well is drilled and the time the pump installer completes the connection from the well to the house plumbing along with the disinfection treatment.

Prior to disinfection, it is expected that the entire well and piping system has been running clear and clean – purged of any sediment, foreign matter, or other materials (due to incomplete development, unsanitary construction, or long idleness of the well). These substances react with the chlorine and decrease its effectiveness in destroying harmful bacteria and organic materials.

APPLICATION:

1. Prepare a chlorine solution by mixing the required amount of chlorine to about 10 gallons of water. For effective disinfection, a minimum of 50 parts per million (ppm) chlorine dosage is required. See Tables 1 and 2 and "Examples" for exact amount of chlorine compound needed to produce the required 50 ppm dosage. Note: For a typical 6" well of about 100'-300' depth, use approximately 4oz. of 70% available chlorine granules (HTH) or 1.0 quart of unscented household 5.25% bleach (Clorox or equivalent).
2. Pour the 10 gallons solution down the well casing.
3. Open each faucet and tap individually in the plumbing system until the chlorine odor is noticed; then close the taps. During this time, it is important that all parts of the water systems come in contact with this chlorinated water. This includes, but is not limited to: hot water heaters, washing machines, dishwashers, tubs, shower heads, yard hydrants and finally urinals and water closets. This should be repeated on all outbuildings connected to the water system. If there are large non-pressure or pressure storage tanks (such as used in a community well supply) on the water system, they should be temporarily water-logged to assure that all water-contact surfaces are chlorinated adequately. All piping should be inspected for dead ends. All dead end piping should be removed, looped or valved off. This allows for both the flushing of stagnant water and the chlorine solution to be introduced. Dead end piping can harbor bacteria. Chlorine will also not enter the piping, unless water flows through it.
4. With the use of a food grade hose connected to a nearby sill cock, recirculate some of the chlorinated water back down and along the interior of the well casing to dilute the initial concentrated solution. (The initial chlorine solution may affect the integrity of the concrete grout, such as between the tile sections of a dug well).
5. Install or replace the watertight well cap on the well casing so that the system cannot be subsequently contaminated. If the existing well is located in a well pit, this is an opportune time to bring the well into

compliance with Public Health Code 19-13-B51. Please refer to the Well Casing Extension Guidance Document on our website for more information.

6. Allow the chlorinated water to stand idle in the well and piping system for at least three hours. It is preferable to allow the solution to remain in the system overnight.
7. With the well pumping, flush the chlorinated water from the system through the storage tank and taps. An outside sill cock may be used to flush the water to waste; however care should be taken to avoid contact of chlorinated water with the grass, shrubbery, streams, brooks, etc. (In a small well supply, it may take a few days to remove all the chlorine from the system). DO NOT OVER TAX A LOW-YIELDING WELL.

DRILLED VS. DUG WELLS:

Most homeowner wells are either drilled or hand dug. In the case of a drilled well, the steel casing should extend a minimum of six inches above the established grade. It should also be outfitted with a certified watertight well cap with screened vent, as is specified in PHC 19-13-B51 (j)(b). The following web site lists all approved watertight well caps in the State of Connecticut: http://www.watersystemscouncil.org/upload/standards/pitless.pdf . An existing well pit should be eliminated and the well casing raised to a minimum of six-inches above established grade. The above listed Well Casing Extension Guidance Document should be referred to for this procedure.

Dug wells are generally "high risk" because they are typically not constructed watertight, allowing the entrance of surface water, insects and rodents. Dug wells must be inspected and repaired prior to disinfection. They should be tightly sealed after chlorination. Serious consideration should be given to connecting to a public water supply, if available. If this is not possible, a properly constructed drilled well should be considered.

BACTERIOLOGICAL TEST:

Before the required water sample is taken, it is very important that there be no trace of chlorine left in the water supply. A desirable and precise method to determine the complete absence of chlorine in the water is to use a chlorine residual test kit.

Once the chlorine is absent from the water system, a sample is collected in a sterile bottle furnished by, and to be analyzed at, a state-approved laboratory. The collection of the sample should be done with care, following the instructions of the laboratory. The sample should be collected from a tap that is representative of water in the distribution system. It is recommended to have either a certified operator or a laboratory technician collect the sample.

The effectiveness of the disinfection and safety of the water supply for drinking purposes is shown if the test report results an absence of coliform bacteria. Note: If the test is found positive for coliform bacteria, a resample should be taken to confirm the first test. Occasional positive tests result from improper sampling technique or other chance contamination. If the resample test is again unsatisfactory, the disinfecting and sampling should be repeated.

TABLE 1

VOLUME OF WATER PER FOOT OF PIPE

Pipe Diameter	Gal/Ft Of Pipe	Pipe Diameter	Gal/Ft. Of Pipe
2.5”	0.254	24”	23.4
4”	0.672	30”	36.6
6”	1.47	36”	52.6
8”	2.61	42”	71.6
10”	4.08	48”	93.6
12”	5.86	54”	119.0
16”	10.45	60”	146.0
18”	13.20	72”	211.0

Table 2

TABLE OF DOSAGE OF DISINFECTANT FOR VARIOUS VOLUMES OF WATER APPROXIMATE CHLORINE DOSAGE TO PRODUCE 50 PPM AVAILABLE CHLORINE

Volume Of Water (Gallons)	Dry Calcium Hypochlorite HTH, Perchloron, or Similar Compound (70% Available Chlorine)	No. Of 5 Gram HTH Tablets (70% of Available Chlorine)	Liquid 5.25% Sodium Hypochlorite Clorox or Similar Household Bleach (5.25 - Available Chlorine)
50	0.5 oz.	3	5fl.oz.
100	1.0 oz.	6	11 fl. oz.
150	1.5 oz.	9	16 fl. oz.
200	2.0 oz.	12	22 fl. oz.
300	3.0 oz.	17	1 quart
500	5.0 oz.	28	2 quarts
1,000	10.0 oz.	56	1 gallon
2,000	1 lb. 3 oz.		2 gallons
3,000	1 lb. 13 oz.		3 gallons
4,000	2 lbs.7 oz.		4 gallons
5,000	3 lbs.		5 gallons
10,000	6 lbs.		
25,000	15 lbs.		
50,000	30 lbs.		
100,000	60 lbs.		

(1 quart = 32 fl.oz)
(1 gallon = 4 quarts)

Example A

Given: 6" drilled well, Depth – 500'

Calculations: (from Table 1)
500 feet x 1.47 gallons per feet = 735 gallons of water to be disinfected

Dosage Required: 50 ppm Chlorine

Use: (from Table 2)
7.5 oz. of 70% HTH or similar compound; (or) 42 HTH tablets (5 grams each); (or) approximately 3 quarts Clorox or similar household bleach.

Example B:

Given: 36" dug well, depth-20'

Calculations: (from Table 1)
20 feet x 52.6 gallons per foot = 1052 gallons of water to be disinfected.

Dosage Required: 50 ppm chlorine

Use: (from Table 2)

10 oz. of 70% HTH or similar compound; (or) 56 HTH tablets (5 grams each); (or) approximately 1 gallon Clorox or similar household bleach.

Example C:

Given: Community well water supply, with same well as in "Example B" (1052 gallons); and, 1-10,000 gallon non-pressure tank; and, 1-5,000 gallon pressure tank

Calculations: Total volume to be disinfected = 1052 gallons + 10,000 gallons + 5,000 gallons = 16,052 gallons

Dosage Required: 50 ppm chlorine

Use: (from Table 2)

9 lbs. 10 oz. of 70% HTH or similar compound

NOTE: In a case where such a large concentration of chorine is required, it is suggested that the dosage applied at the well be staggered, i.e., 5 portions of 2 lbs. HTH per each 10 gallons of solution water over a period of time.