



Environmental Health Services

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DISINFECTION OF WATER WELLS - GENERAL INFORMATION

Chlorination is the placement of chlorine (household bleach) into a water well and plumbing system. New water wells and existing water supplies that have been exposed to bacterial contamination must be disinfected and a satisfactory water sample collected prior to use. Bacterial contamination from drilling operations is usually eliminated provided sanitary well drilling and plumbing practices were followed. Usually a chlorine concentration of 100-200 parts per million (ppm) is adequate. Occasionally, however, contamination may be persistent and require several chlorinations, or in some cases, higher chlorine concentrations (500-2000 ppm) due to high chlorine demand from conditions such as alkalinity, hardness and turbidity.

Before attempting chlorination of a well, it is essential to check the following:

1. All repairs to the well should be completed before the chlorination process.
2. Check the condition of the well:
 - a) location b) well casing c) sanitary seal (well cap)
3. Check the condition of the plumbing:
 - a) dead ends and leaking pipes b) pressure tank c) cross connections

Unless you are familiar with water wells, and are comfortable working with chemicals, the well chlorination should be done by a licensed water well contractor, pump installer or licensed plumber (especially in the case of a point driven well or a well in a pit). If you have water treatment devices, consult with your water treatment company before the chlorination.

WELL CHLORINATION PROCEDURE - STEPS TO FOLLOW

NOTE: Use extreme caution when following this procedure. Chlorine is a strong oxidizing agent and is highly corrosive, especially at levels over 100-200 ppm. It may cause skin and eye damage, or irritation to the nose and/or throat. Use goggles and rubber gloves when handling this material. We also recommend that protective clothing (splash apron) and rubber boots be worn. Always provide adequate ventilation when using chlorine.

1. **Caution** should be taken when removing the well cap, as bare wires may be exposed posing a electrical hazard. You may consider shutting off the power to the well pump.
2. Loosen and remove the well cap. Set the well cap on a clean surface. Determine the amount of chlorine by referring to Table 1. If you are unable to determine the depth of your well, contact a licensed water well contractor. Pour the bleach slowly into the well. Turn the power back on.

Table I

DEPTH OF WELL	QUANTITY OF CHLORINE (Sodium Hypochlorite) 5 1/4% or 5 3/4% Liquid Household Bleach
10' – 50'	1 GALLON
51' – 100'	1 - 2 GALLONS
101' – 150'	2 - 3 GALLONS
151' – 200'	2 - 4 GALLONS
200' OR DEEPER	2 - 5 GALLONS

Note: Depending on conditions in your well, these quantities of chlorine may give concentrations upwards of 1000 ppm. LCHD ADVISES THAT YOU CONSULT YOUR WELL CONTRACTOR FOR A RECOMMENDATION OF HOW MUCH CHLORINE TO ADD TO YOUR WATER WELL.

3. Attach a clean hose to an outside spigot and place the hose into the well casing. Turn the hose on and circulate the water until a strong chlorine odor is detected from the hose. **If you have a water softener it is always best to check with the water treatment company before you allow any chlorine into the water softener.** You may bypass the water softener unit throughout the entire chlorination process. Do not reopen the bypass valve until the distribution system has been flushed and a satisfactory water sample has been collected.
4. Wash down the interior of the well casing and drop pipe with the hose, in a swirling motion from top to bottom. Continue circulating the chlorine by leaving the hose in the well throughout the entire chlorination process.
5. Open one hot faucet first and let the water run, then open the cold water faucet farthest from the pressure tank and let the water run until a strong chlorine odor is detected.
6. It is best to verify the chlorine concentrations by using a test kit. Chlorine test papers are available through restaurant suppliers. The maximum detectable limit is 200 ppm. If chlorine is not present or is weak at any faucet, add small amounts of chlorine into the well to maintain or increase the desired chlorine concentration.
7. Open the remaining cold faucets one at a time, checking the chlorine concentration. Shut the faucets off after the proper concentration is noted. **Caution: Do not let all of the water faucets run at the same time because you may loose system prime or damage your pump.**
8. Starting at any location, open the remaining hot water faucets one at a time until each faucet has been run. Allow hot water to run at least 30 to 60 seconds until a strong chlorine odor and/or a noticeable drop in water temperature is detected. In some cases, the water heater may have to be completely emptied before chlorine concentration can be detected at the faucet. Shut the faucet off after proper concentration is noted.
9. All the toilets should be flushed at least once. Check chlorine concentration inside the water tank above the toilet.
10. Unfinished plumbing that has been capped (plumbing dead ends) should be flushed. If necessary, provide a temporary faucet. Plumbing that is no longer in use should be removed from the distribution system. Contact a licensed plumber to perform the work. Check chlorine concentration and shut each faucet off after proper concentration is noted.
11. All outside spigots and household appliances connected to the water supply (i.e. dishwasher, washing machine, ice maker, etc.) must be disinfected. Check chlorine concentration and shut faucets off after the proper concentration in noted.
12. If you do not have a fire suppression (indoor sprinkler) system, proceed to step #13. If fire suppression is present, partly drain the system storage tank so the pump turns on and begins drawing chlorinated water into the system and the tank. Then shut the pump off and check chlorine concentration at the storage tank outlet drain.
13. Disconnect the water feed line to the furnace humidifier and turn the valve on and allow the water to run until a proper chlorine concentration is noted.

14. After completing the chlorination, rinse the well cap with chlorinated water and turn the outside spigot off. Replace the well cap to form a watertight seal. All bolts and screws must be reattached. If any parts are lost or broken, replace them as necessary.
15. Once the chlorinated water has reached all the appliances, fixtures, and faucets, let the chlorinated water stand in the well and plumbing system at least overnight, though longer contact times of 24-48 hours are more effective. In some cases, a 3 to 4 day time span may be necessary. Chlorine disinfection becomes more effective by increasing the contact time and chlorine concentration. **WHILE THE CHLORINE IS IN THE SYSTEM DO NOT DRINK THE WATER. CONTACT WITH THE WATER MAY CAUSE SKIN, EYE AND NOSE IRRITATION.**
16. When the chlorine has been contained in the well for a sufficient period of time, start flushing the chlorine from the system by running an outside spigot to a culvert or drainage ditch until you can no longer detect chlorine in the water. NOTE: Do not run the well excessively to avoid damaging the well pump, and avoid running the water into or onto the septic system or onto grass or plants that you do not wish to be damaged by the chlorine.
17. After the chlorine has been flushed from the well, flush the hot and cold water faucets, appliances and fixtures, one at a time. The length of time for flushing depends on the concentration of chlorine, depth of the well, formation type, the pH and the size of the distribution system. It will usually take 4 to 8 hours to flush the well after a standard well chlorination. The water may become discolored during flushing because the chlorine may have loosened the hard water deposits in the plumbing. **Caution: The chlorine must be completely flushed from plumbing system. Chlorine may damage the rubber and plastic parts in the faucets and plumbing.**
18. If bacterial contamination persists, rechlorinate using a stronger chlorine concentration and/or a longer contact time. With persistent contamination, it may be necessary to do multiple chlorinations without interruption over a period of several days before collecting a water sample. Using a chlorine concentration over 2000 ppm in a water pressure storage tank is not recommended.
19. The water supply must be totally free of chlorine before a water sample is collected again. You may either collect a sample using approved laboratory sample bottles from our Department or you may contact us and schedule a time for us to come out and take a sample. If you pick up a bottle, a laboratory analysis fee must be paid at that time. The water sample collection fee includes our site visit, well inspection and water sample. The fees for these services are set by the current Lake County Board of Health Ordinance Article XIII.

References

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