



Ohio Department of Health Bureau of Environmental Health

Disinfection Fact Sheet for Flooded Drinking Water Wells *Simple procedures for homeowners.*

Bob Taft, Governor
J. Nick Baird, MD, Director of Health

"To improve and protect the health of all Ohioans"

The following well disinfection procedures may be carried out by homeowners on an existing well after flooding of the well has occurred. During flooding, contaminated water enters the well casing and forces flood water out into the geologic formations providing the water supply. This water will need to be removed from the well and then the well must be disinfected. A total coliform bacteria sample is used as an indicator of unsanitary conditions. If total coliform or e-coli positive samples persist, then an experienced registered private water systems contractor should be contacted to professionally disinfect your well using superchlorination methods. (See Superchlorination Disinfection Fact Sheet)

Step 1. Pump the Well

Turn on as many faucets in the home as possible, and run the water for several hours (24 hours if possible) to waste in the yard or other drainageway. The well should be heavily pumped to remove as much flood water as possible from the casing and the geologic formation. When a well is flooded, the contaminated water enters the well and can move out into the geologic materials that supply water to the well. Overpumping well help remove flood water from the ground water supply. Do **not** discharge this water to the septic system, as it will cause the system to become overloaded.

Step 2. Determine the total volume of water stored in your well.

The volume of chlorine used for disinfection depends on the total volume of water stored in the well casing and the distribution lines (plumbing). The total volume of water stored in the well casing can be calculated based on the total depth of the well and the static water level in the well. Information on the total depth and static water level (water level under non-pumping conditions) of the well can be obtained from the well log. The well log is a record of the construction, depth and geologic materials encountered in the well and is filled out by the water well driller. After the well is drilled, copies of the well log are filed with the Ohio Department of Natural Resources, Division of Water, the local county health department, and a copy is provided to the well owner. If you do not have a copy of your well log, search their website at www.dnr.state.oh.us/water/maptechs/wellogs/app/, or contact ODNR, Division of Water at (614) 265-6740. The total depth of the well will be recorded at the right side of the well log, and the static water level will be recorded under the well test section of the well log. Subtract the static water level from the total depth of the well to determine the total feet of water held in the well casing.

The image shows a sample 'WELL LOG AND DRILLING REPORT' form. It is divided into several sections: 'WELL LOCATION', 'CONSTRUCTION DETAILS', 'WELL TEST', and 'DRILLING LOG'. The 'WELL LOCATION' section includes fields for County, Township, Range, Section, and Address. The 'CONSTRUCTION DETAILS' section includes fields for Well Depth, Casing Material, and other specifications. The 'WELL TEST' section includes fields for Static Water Level and Pumping Rate. The 'DRILLING LOG' section is a table with columns for Depth (ft), Lithology, and other details. The form is filled out with sample data, including a well depth of 122 feet and a static water level of 22 feet.

Step 3. Determine the volume of chlorine to use for disinfection

Once the total feet of water stored in the casing is known, then the volume of water stored in the casing can be calculated based on Table 1. Take the total feet of water stored in the well, and based on the well diameter, multiply the total feet times the appropriate gallons per foot of water.

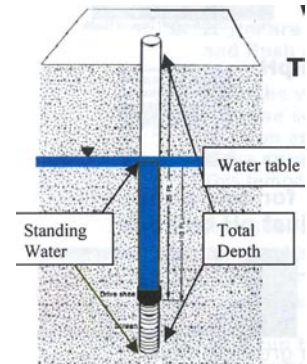
Example:

Total well depth is 100 feet, static water level is 60 feet, well casing diameter is 5 inches.

100 feet – 60 feet (static water level) = 40 feet of water in the well casing

From Table 1, a 5 inch casing has 1 gallon stored per foot.

40 feet of water in the casing x 1 gallon per foot = 40 gallons volume of water in casing



Diameter of well (inches)	Gallons per foot of water
3	0.37
4	0.65
5	1.0
6	1.5
8	2.6

The total volume of chlorine to be used for disinfection can be calculated based on the Table 2. For the example cited above (40 gallons of water in the well casing), use approximately one-half of the amount of chlorine necessary to disinfect 100 gallons.

Chlorine concentration (parts per million)	Gallons of 5.25% sodium hypochlorite - liquid bleach	Pounds of dry calcium hypochlorite	Minimum contact time
250	0.5 gallons	0.38	8 hours
500 ppm	1 gallons	0.75 pounds	8 hours

If the total volume of water stored in the well casing is unknown then add two gallons of fresh 5.25 % unscented laundry bleach, also called sodium hypochlorite, to five gallons of water. Mix the solution in a new clean garbage can, or clean a garbage can and line it with a new plastic garbage bag. Laundry bleach loses its' effectiveness the longer it sits on the shelf in the store or in your home. Solid chlorine pellets, which are 65% to 70% calcium hypochlorite, should be



dissolved in a five gallon bucket of water. Be aware that some solid chlorine products used for swimming pools may have additional chemicals, such as algaecides, in them and should not be used for well disinfection. Place the can next to the well to pour the solution or siphon the chlorine solution from the can to the well.

Step 4. Add the chlorine solution.

Remove the cap from the well. Pour this solution directly into the well.

Step 5. Add vinegar.

Add 1 quart of white vinegar to a five gallon bucket of water for each 100 gallons of water stored in the well. If the total amount of water stored in the well is unknown, add 2 quarts of vinegar. Add this solution to the well.



Step 6. Flush and re-circulate.

With a garden hose, re-circulate this solution back into the well washing down the sides of the casing for about ten minutes. Debris may begin to slough off the side of the casing, and iron or manganese in the water may begin to turn solid as the chlorine reacts with the minerals.

Turn on **all** faucets connected from the well throughout the house and outside the house. Make sure to turn on faucets that rarely or never get used, especially yard hydrants. Remember to run water into the washing machine and flush all toilets. Run the water until the chlorine smell is detected. **Do not** by-pass the water softener or the water heater. The water softener and water heater must be disinfected also. The resin bed of the water softener can provide a place for bacteria to grow. Remove and discard any carbon filters or cartridge filter elements and thoroughly clean the inside of the filter housing.



Step 7. Maintain sufficient contact time.

Once the odor of chlorine is detected in all water lines, shut off the faucets and let the water sit in the plumbing for at least 24 hours.

Step 8. Flush the chlorine from the water system.

After 24 hours have elapsed, run the water to waste until the entire odor of chlorine is gone. This will take a while depending on the volume of the well and the plumbing. **Do not** run the water into your septic system as this will cause the system to become overloaded.

Step 9. Retest the well for total coliform.

Wait a minimum of 48 hours, then contact the local health district to have another sample collected for total coliform bacteria. Make sure that the water is checked for chlorine before collecting the water sample. If there is any indication of chlorine in the water, the sample should not be collected. This helps avoid getting an indication of a safe sample that may be

due only to the continuing activity of leftover chlorine and may not reflect the true condition of the water. Do not replace carbon filters or filter elements until a coliform negative sample has been achieved.

What if the well tests positive for total coliform after disinfection?

There are many instances where the previously described disinfection procedures may not work in making a water well bacteria free. In some cases the pH of the water may need further adjustment in order to get the optimum disinfection from the added chlorine, or superchlorination procedures may be required. The well casing may also need a thorough scrubbing or cleaning to remove flood sediment, or non-pathogenic slime forming or iron bacteria that can build up on the well casing and borehole walls. This type of cleaning is best performed by a registered contractor. If total coliform or e-coli bacteria persist in water samples then contact an experienced registered private water systems contractor to professionally disinfect your well. Contact your local health district when you experience any problems with your well or for assistance.

The Ohio Department of Health registers and bonds private water systems contractors. Please contact your local health district or check <http://www.odh.state.oh.us/ODHPrograms/WATER/water1.htm> for the most current list of registered contractors.

Residential Water and Sewage Program
Bureau of Environmental Health
Ohio Department of Health
246 N. High St.
Columbus, Ohio 43266-0118
(614)466-1390
www.odh.state.oh.us