Hocking County Health Department

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Disinfecting a Water Well

Because contamination occurs during the construction and/or repair of a well and the plumbing system, both should be disinfected before being used and the easiest way is by flushing and chlorination. Flushing simply means running water through the system for several hours at a time preferably to an outside drain so the septic system is not overloaded. To chlorinate a well, follow the steps listed below. First determine the amount of water in the well and use the correct amount of white vinegar and bleach. Too much chlorine will actually drive the pH of the water to such a high level that there is little to no sanitizing action.

Step 1: Pump the well

Turn on at least one outside spigot and run the water for several hours (24 hours if possible) to waste in the yard or other drainage way. The well should be heavily pumped to completely flush the well borehole and the geologic formation that supplies the water. If you have a low yielding well, be careful not to pump so hard that the pump runs dry (as this could damage the pump). You may want to consider re-sampling your well for bacteria after pumping because in some cases heavy pumping can result in an acceptable bacteria sample result. Do **not** discharge this water to the septic system, as it will cause the system to become overloaded.

Step 2: Determine amount of water stored in the well

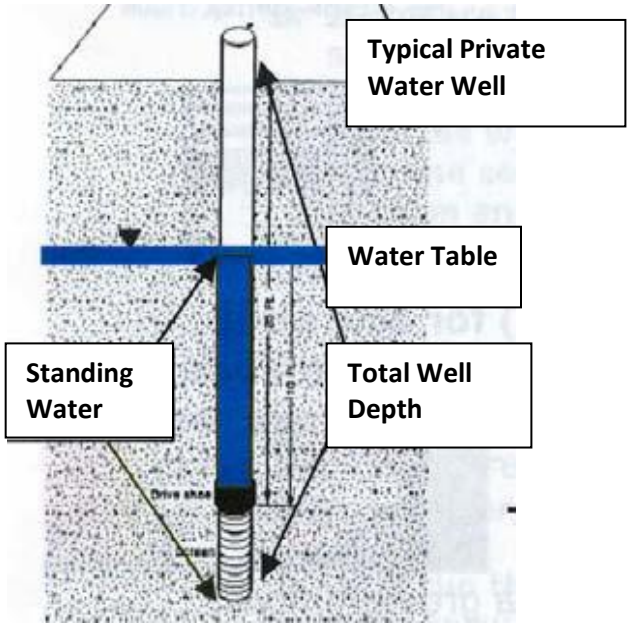
The total amount of white vinegar and chlorine used for disinfection depends on the total amount of water stored in the well and the distribution lines (plumbing). Consult your well log to determine the total depth of the well and the static water level. The well log is a record of the construction, depth and geologic materials encountered in the well and is filled out by the water well driller.

After a well is drilled copies of the well log are filed with the Ohio Department of Natural Resources (ODNR) - 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:

- Contact the Hocking County Health Department at (740) 385-3030 ext. 2, or
- Search the ODNR 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.



Step 3: Determine the volume of vinegar solution
Once the total feet of water stored in the casing is known, calculate the volume using Table 1. Multiply the total feet of water in the well by the appropriate gallons per foot of water based on the diameter of the well.

Example:
Total well depth is 120 feet, static water level is 20 feet, well casing diameter 5 inches.
120 feet – 20 feet (static water level) = 100 feet of water in the well casing
From Table 1, a 5 inch casing has 1 gallon stored per foot.
100 feet of water in the casing x 1 gallon per foot = 100 gallons volume of water in casing

Table 1. Volume of water in well	
Diameter of well (inches)	Gallons per foot of water
3	0.37
4	0.65
5	1.0
6	1.5
8	2.6

For every 100 gallons of water stored in the well, 3 gallons of white vinegar is needed. Mix the amount of vinegar required with water in a clean bucket or garbage can and pour mixture down into the well. This will help lower the PH to maximize the sanitizing action of the bleach that will be added in the next step.

Our sample well only requires 3 gallons of white vinegar while a well that stores 200 gallons of water would require 6 gallons of white vinegar. If the total volume of water stored in the well casing is unknown, add three gallons of white vinegar to five gallons of water and pour down into the well.

Step 4: Determine the volume of chlorine
For every 100 gallons of water, one gallon of fresh 5.25% unscented household liquid bleach is needed. Mix the amount of bleach required with water in a clean bucket or garbage can before pouring down into the well. Bleach should never be poured directly into a well since it is a very corrosive agent and can cause damage to the pumping equipment and should never be mixed directly with vinegar.

Our sample well only requires one gallon of bleach to properly sanitize the well while a well that stores 200 gallons of water would need two gallons of bleach. If the total volume of water stored in the well casing is unknown, add one gallon of fresh 5.25% unscented household liquid bleach to five gallons of water and pour down into the well.

Step 5: By-Pass Water Treatment Units
By-pass all water treatment units during the initial chlorination process to avoid damage to the resin bed. The resin bed of the water softener can provide a place for bacteria to grow, and must be chlorinated at lower concentrations. The water softener should be disinfected separately using ¼ to ½ cup of chlorine bleach placed into the small fill tube in the large brine tank followed by a manual recharge. Remove and discard any carbon filters or cartridge filter elements and thoroughly clean the inside of the filter housing. Follow manufactures' guidelines or call your softening company with additional guidance for disinfecting treatment units.

Step 6: Flush and re-circulate
With a garden hose, re-circulate the chlorine solution back into the well washing down the sides of the casing for approximately 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. Run the well to waste outside long enough and hard enough to reduce the debris that has come loose before you run anything inside the house - especially the washing machine. You may need to re-treat the well with another vinegar and chlorine solution before continuing to the next part of Step 6.

After the water has run clear for a while turn on **all** faucets connected to the well throughout the house, hot and cold, and outside the house. Make sure to turn on all of the faucets that rarely or never get used, especially yard hydrants and outside spigots. Remember to run water into the washing machine and flush all toilets. Run the water until the chlorine smell is detected.

Step 7: Maintain sufficient contact time
Once the odor of chlorine is detected in all the water lines, shut off the faucets and let the water sit in the plumbing for 8 to 24 hours. Minimal toilet flushing is acceptable during this time.

Step 8: Flush
After sufficient contact time has 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 all the water into your septic system as this will cause the system to be overloaded.

Step 9: Testing the well
Contact the Health Department for a water test. The chlorine must be flushed out of the system at least 48 hours before it can be sampled. All softeners and filters should be bypassed. Do not replace carbon filters or filter elements until an acceptable bacteria result has been achieved.

What if the well repeatedly tests positive for bacteria?
It is not unusual for a new well to test positive the first or second time. This is due to the amount of contamination introduced during the drilling process and/or because the plumbing is not clean when it is installed.

If the water still tests unsafe after the second test, it may be necessary to contact a registered private water system contractor to professionally disinfect your well. The well casing may also need a thorough scrubbing or cleaning to remove non-pathogenic slime that forms on iron bacteria that can build up on the well casing and borehole walls. Removal of this type of bacteria often requires the use of specially formulated well cleaning products and drilling equipment and is best performed by a registered contractor.

The Ohio Department of Health registers and bonds private water systems contractors. Please contact the Hocking County Health Department for a current list of registered contractors or check the Ohio Department of Health website at http://www.odh.ohio.gov/odhPrograms/eh/water/PWSreg.aspx for the most current list of registered contractors and other private water system information.

Reasons to Test Your Water

The chart below will help you spot problems. The last five problems listed are not an immediate health concern, but they can make your water taste bad, may indicate problems, and could affect your well long term.

Conditions or Nearby Activities:	Test for:
Recurring gastro-intestinal illness	Coliform bacteria
Household plumbing contains lead	pH, lead, copper
Radon in indoor air or region is radon rich	Radon
Corrosion of pipes, plumbing	Corrosion, pH, lead
Nearby areas of intensive agriculture	Nitrate, pesticides, coliform bacteria
Coal or other mining operations nearby	Metals, pH, corrosion
Gas drilling operations nearby	Chloride, sodium, barium, strontium
Dump, junkyard, landfill, factory, gas station, or dry-cleaning operation nearby	Volatile organic compounds, total dissolved solids, pH, sulfate, chloride, metals
Odor of gasoline or fuel oil, and near gas station or buried fuel tanks	Volatile organic compounds
Objectionable taste or smell	Hydrogen sulfide, corrosion, metals
Stained plumbing fixtures, laundry	Iron, copper, manganese
Salty taste and seawater, or a heavily salted roadway nearby	Chloride, total dissolved solids, sodium
Scaly residues, soaps don't lather	Hardness
Rapid wear of water treatment equipment	pH, corrosion
Water softener needed to treat hardness	Manganese, iron
Water appears cloudy, frothy, or colored	Color, detergents