



## Shock Chlorination of Wells and Springs

F 140

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### A Common Problem

Bacterial contamination is one of the most common water quality problems among private water systems in Pennsylvania. Surveys have shown that approximately 40 percent of wells and springs in the state contain coliform bacteria. These bacteria are a potential problem because they may cause serious gastrointestinal illnesses.

Homeowners often assume that a positive test for coliform bacteria in their well or spring indicates a contamination problem that must be treated continuously with a disinfection treatment system like ultraviolet light or chlorination. However, some positive bacteria tests are the result of a less-serious, one-time contamination incident. For example, bacteria may be introduced when a new submersible pump is installed in a well or from surface runoff during an unusually heavy rainfall. Shock chlorination is a simple and inexpensive process that can be used to disinfect water supplies that have been contaminated as a result of these one-time contamination incidents. When done properly, shock chlorination will kill all of the bacteria existing in a well. After following the procedure outlined below, retest your water for coliform bacteria approximately two weeks after the shock chlorination. If no coliform bacteria are present, wait an additional two to three months and have the water tested again. If the bacteria return in either of these subsequent tests, a continuous disinfection treatment system will be necessary to correct the problem.

### Disinfection Procedure

#### *Wells*

If your water is cloudy or contains any suspended particles, the well should be pumped until the water clears. Cloudy water will greatly reduce the ability of the chlorine to kill bacteria. Unscented household chlorine bleach containing 5.25 percent available chlorine may be used to shock chlorinate private water supplies; however, only chlorine products with label information specifying use in potable water supplies can be recommended. These must be obtained from water treatment equipment dealers. Use the table on the next page to determine the amount of bleach you will need.

Note that the water depth shown in this table refers to the actual depth of water in the well and not the total depth of the well. In some cases, it may be difficult to determine the actual depth of water in the well. In these cases, use a minimum of ½ gallon of bleach if you estimate the water depth to be less than 80 feet and the well diameter is 8 inches or less. For wells with greater water depth and diameter, use one gallon of bleach. **It is always better to use too much chlorine rather than too little!**

Remove the cap or seal from the top of the well and mix the chlorine with 5 to 10 gallons of water in a non-metallic container. Pour this solution into the well. To adequately mix the chlorine solution in the well, run a hose from a faucet into the well and

### **When to Shock Chlorinate Your Well or Spring**

- \* **After construction of a new well (many well drillers do this as a standard practice)**
- \* **After working on an existing well or installing a new submersible pump**
- \* **After receiving a positive water test report for coliform bacteria**

The amount of bleach required to disinfect a water well.

Water Depth (ft)	Well Diameter, in.					
	6	8	10	24	32	36
10	1 c	1 c	2 c	3 qt	4 qt	6 qt
20	1 c	2 c	4 c	5 qt	8 qt	10 qt
30	2 c	4 c	3 pt			
40	1 pt	2 pt	4 pt	c=cup, pt=pint, qt=quart		
60	2 pt	3 pt	6 pt			
80	2 pt	4 pt	7 pt			
100	3 pt	5 pt	4 qt			
150	5 pt	4 qt				

circulate water into the well, washing down the sides of the casing, for about 15 minutes. Close the faucet and reseal the well. Inside the home, turn on all of the faucets (one at a time) until a strong chlorine odor is noticeable at each tap. This will ensure that the chlorinated water has been dispersed throughout the plumbing system. Allow the water to sit in the plumbing for a minimum of six hours and preferably 12 hours. Flush all of the indoor faucets by letting them run until the chlorine smell dissipates to an acceptable level. Note that complete removal of the chlorine smell may take several days of normal water use.

### ***Springs***

Proper shock chlorination of a spring is difficult because the water often runs through the spring box too quickly to provide adequate contact with the chlorine to kill bacteria. Shock chlorination of a spring can be attempted by mixing about ½ cup of household bleach with five gallons of water and use

this solution to scrub the walls of the spring box. Estimate the volume of water in the spring box in gallons (there are 7 ½ gallons of water in each cubic foot of storage). For each 100 gallons of water in the spring box, create a disinfection solution by mixing about 3 pints of chlorine solution with a few gallons of water. Pour the disinfection solution into the spring box. Use the instructions above to disinfect each of the faucets in the home and run the water to a disposal site the next day. Because of the prevalence of bacteria in springs and the difficulty in adequately shock chlorinating the spring source, it is often necessary to install continuous disinfection treatment equipment for spring sources that test positive for coliform bacteria.

The first water used following chlorination will have a chlorine concentration about the same as used for bleaching laundry. It may be used for cleaning or run on the ground. Bare ground is best, sprinkling on grass is ok, do not apply to foliage of ornamental shrubbery or to any water body containing fish.

### **Additional Resources**

For further information and resources on:

- Drinking Water Quality (see fact sheet
- F 101 *Drinking Water Publications from the Penn State College of Agricultural Sciences*)
- Groundwater Protection Watershed Monitoring & Control Systems

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For more information about other Outreach Publications and Resources from the Department of Agricultural and Biological Engineering:

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