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SCS Communications  
Soil & Crop Sciences  
TAMU  
College Station, TX  
77843-2474

Rio Grande Basin Initiative administered by the Texas Water Resources Institute of the Texas A&M University System Ag Program with funds provided through a grant from Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Agreement No. 2001-45049-01149.

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Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Chester P. Fehlis, Deputy Director, Texas Cooperative Extension, The Texas A&M University System.



# Shock Chlorination of Wells

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## Introduction

Shock chlorination is a disinfection treatment recommended when a domestic drinking water system is contaminated with bacteria. Contamination can occur when the well is installed, when repairs are made to the pump or plumbing, or runoff water enters the well during rainfall events. Shock chlorination should take care of contamination that is introduced during these activities.

If the groundwater itself is the source of bacteria, the system will be contaminated again when that water is pumped into the plumbing. In that case, continuous chlorination or other disinfection methods will be necessary to ensure the safety of the water supply.

Shock chlorination introduces very high levels of chlorine into a water system. During the disinfection process, water from the system is not suitable for consumption or extended contact by people or animals. Plan to perform the disinfection process when faucets and toilets will not be in use for at least 12 hours, preferably 24 hours.

Shock chlorination will be most effective if the chlorine reaches every part of the water system. Special precautions are needed on automatic water systems for animals and irrigation. Provide alternate water sources for pets or livestock who depend on automatic waterers, then make sure the chlorine reaches those outlets. Chlorinated water flushed out of a sprinkler or drip system should be directed away from landscaping plants and lawn areas to avoid damage to the plants.

Most water treatment equipment (such as water heaters, softeners, and pressure tanks) should also be disinfected. Drinking water filters, such as carbon filters, should be temporarily disconnected or by-passed during shock chlorination. Activated carbon filters left in place during the chlorination process will actually remove the chlorine until they become overloaded. Check owner's manuals or manufacturers' literature before shock chlorinating to avoid damage to components.

## Chlorine Sources

Chlorine is a universal disinfecting agent which is highly toxic to bacteria at concentrations of 200 milligrams per liter and above. Shock chlorination of a well involves adding a chlorine solution to the water supply so it reaches a concentration of 200 milligrams/liter followed by circulating it to disinfect all parts of the water system.

Chlorine is available in several different forms. The two most often used for well disinfection are dry chlorine and liquid household bleach. Dry chlorine contains about 65% calcium hypochlorite; bleach contains about 5.25% sodium hypochlorite. When used properly, both are equally effective for disinfecting wells. Do not use bleach with a “fresh scent”, lemon fragrance, or other cleaner additives because it may contain chemicals not suitable for human or animal consumption.

## Chlorination Procedure

The amount of chlorine needed is determined by the amount of water standing in the well. To determine the depth of water in the well contact the company that constructed your well. They should be able to provide you with the water well depth and static water level. The standing water depth in the well will be the well depth minus the static water level. For example, a water well 110 feet deep and a static water level of 90 feet would contain a standing water depth of 20 feet (110 ft. - 90 ft. = 20 ft.). Table 1 lists the amount of ordinary household bleach (5.25% hypochlorite) needed for shock chlorination based on casing diameter and standing water depth in the well. If the standing water depth of the water in the well is unknown, use a volume of bleach equal to two times the depth value for the appropriate casing diameter. For example, an 8-inch casing diameter with unknown standing water depth would require three gallons of household bleach. Do not use bleach in excess of the recommended amount because it is not

necessary and will require additional flushing before household use is appropriate. Similar information is provided for use of dry chlorine (high-test hypochlorite) in Table 2. High-test hypochlorite is available in powder or tablet form.

### Precautions

Wear protective eyewear and clothing (rubber boots and gloves) when mixing and using household bleach or dry chlorine. Extra precaution should be taken with the dry chlorine tablets due to the intense chlorine fumes they generate. If you have excess tablets, store them in an airtight container, because moisture in the air will “melt” the tablets.

**Note:** Always have a five gallon container of clean, fresh, unchlorinated water nearby for emergency purposes. If chlorine accidentally comes in contact with eyes or skin, flush immediately with fresh water for 10 to 15 minutes. Seek medical attention immediately.

The procedure for shock chlorination treatment of a private water well is as follows:

1. Drain as much water from the system as possible before chlorinating. For systems with pressure tanks containing a bladder, the rubber air-water separator in the tank may be damaged by the chlorine solution. Check your manufacturer’s guide to see if the pressure tank should be bypassed. For pressure tanks without bladders, release the air to allow the tank to be filled with chlorinated water. Also drain all hot water heaters to allow chlorinated water to circulate through the hot water system.
2. Locate plug or screen on well cap and remove to give access to inside well casing. Dilute the liquid bleach by placing the appropriate amount of bleach (see Table 1) in a five-gallon bucket and filling the bucket with clean water. This increases the

volume. Place a funnel in the well's access hole and pour the solution around the sides of the well casing. If using dry chlorine, place the desired amount of dry chlorine (based on Table 2) in a five-gallon bucket and again fill the bucket with clean water to dissolve the bleach.

3. Connect a garden hose to a nearby faucet and run hose to the funnel in the well's access hole to wash down the inside of the well. Continue the washing process for ten minutes and make sure a strong chlorine smell can be detected. Start and stop well pump several times to ensure chlorine is mixed thoroughly with the well water.
4. Do not operate the water system for two hours.
5. After two hours, open the faucet closest to your well, allow water to run until a strong odor of chlorine is detected, then close the faucet. Proceed to the next faucet and repeat. Continue until chlorine is detected in all faucets. If the odor is not detected, check the rate from the appropriate table and add more chlorine to the well, repeating steps one through four.
6. Do not operate the water system for at least 12 and preferably, 24 hours.

7. Next, flush the system of remaining chlorine. Begin by turning on outside faucets and letting the water run until the chlorine smell dissipates. Let the water run on the ground to reduce the load on your septic system. High loads of chlorine in the septic tank can kill beneficial bacteria and require re-inoculation of the septic system. Also, do not apply water with high chlorine levels to lawns, gardens or other sensitive plants because injury can occur. Use a garden hose placed in an area that drains into a field or low lying area to direct the chlorinated water away from sensitive plants. Be careful to protect aquatic environments by not discharging the chlorinated water directly into lakes, rivers, or streams.
8. Finally, turn on the indoor faucets until the system is completely flushed.
9. Follow up chlorination by getting well water tested again for bacterial contamination.
10. If bacteria contamination is detected in well water for a second time, repeat chlorination process, followed by a second well water bacterial test.
11. If bacteria contamination is detected a third time, consider adding a continuous chlorination or other disinfectant system.

**Table 1. Amount of chlorine bleach needed for shock chlorination**

**Laundry Bleach (about 5.25% hypochlorite)**

Standing Water Depth in Well (in feet)	Casting Diameter				
	4 inch	6 inch	8 inch	10 inch	12 inch
10	½ cup	1 cup	1½ cups	1 pint	2 pints
25	1 cup	1 pint	2 pints	3 pints	4½ pints
50	1 pint	1 quart	2 quarts	3 quarts	1 gallon
100	1 quart	2 quarts	1 gallon	1½ gallons	2 gallons
150	3 pints	3 quarts	1½ gallons	2 gallons	3 gallons

**Table 2. Amount of dry chlorine needed for shock chlorination**

**High-Test Hypochlorite (HTH 65-75% hypochlorite)**

Standing Water Depth in Well (in feet)	Casting Diameter				
	4 inch	6 inch	8 inch	10 inch	12 inch
10	---	---	---	---	---
25	---	---	---	1/4 lb.	1/4 lb.
50	---	---	1/3 lb.	1/2 lb.	3/4 lb.
100	---	1/3 lb.	3/4 lb.	1.0 lb.	1½ lbs.
150	1/4 lb.	1/2 lb.	1.0 lb.	1½ lbs.	4.0 lbs.

## References

This fact sheet was developed using existing publications from the University of Nebraska (G95-1255A), Auburn University (ANR-790), The Texas Natural Resource Conservation Commission (GI-005), and other information sources.

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