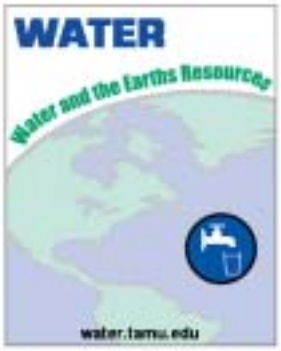
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Shock Chlorination of Stored Water Supplies

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Treatment of drinking water to improve its sanitary or bacteriological quality is referred to as **disinfection**. **Shock chlorination** is one disinfection method employed by public suppliers to reduce bacterial contamination of water. This method also can be used by private-water-well owners.

Water Wells

Water wells contaminated with bacteria can be shock-chlorinated by introducing chlorine into them and into their water-distribution systems. Proper steps for shock chlorination of private water wells are outlined in Texas Cooperative Extension publication number L-5441, *Shock Chlorination of Wells*. By carefully following each step outlined in this publication, owners of private water wells can reduce risks of bacterial contamination of their well water. While these procedures effectively may sanitize water wells and distribution systems, additional steps may be necessary to shock- chlorinate water stored in tanks.

Storage Tanks

In several regions of Texas, such as the Texas Hill Country and the Central Texas Blacklands, water is pumped from wells into large storage tanks. Pipes from such tanks then deliver water to houses for domestic use. However, shock-chlorinating a water well alone may not provide enough chlorinated water to disinfect water already in the system's storage tank.

The storage tank could be drained completely and refilled with treated water from a chlorinated well. However, given the sizes of some storage tanks (greater than 5,000 gallons), such an approach can be wasteful, increasing energy costs for the well pump to refill the tank. Refilling can also take a long time, because some wells have pumping capacities of only 5 to 6 gallons per minute. In addition, some aquifers may not be able to deliver large amounts of water over a short period of time due to the aquifer's limited yield capacity.

Alternatively, the water already in the storage tank can be shock-chlorinated. This procedure requires knowledge of (1) the relative strength or concentration of chlorine in the product used, (2) the volume in gallons of the water stored in the tank, and (3) the contact time needed to allow the chlorine to react with and disinfect the stored water.

Calculating Chlorine Amounts

To sanitize water properly, enough chlorine needs to be added to a storage tank to reach a chlorine-to-water concentration of 200 mg/L or 200 parts per million (ppm). Refer to Table 1 to determine the amount of chlorine product to use.

Table 1. Amount of chlorine product required to achieve a chlorine-to-water concentration of 200 ppm.	
Chemical Product	**Amount to Use Per 100 Gallons of Water***
Liquid laundry bleach (5.25% hypochlorite)	1.5 quarts or 48 liquid ounces
High-test calcium hypochloride (65-76% hypochloride)	4 ounces

*Well water containing iron, hydrogen sulfide, or organic substances may require a greater amount of chemical to produce a 200 ppm solution.

Remember, when using 5.25 percent hypochlorite liquid bleach, chose a plain or unscented variety. High-test hypochloride can be purchased in powder or tablet form.

Adding Chlorine Products to a Tank

After determining the appropriate amount of chlorine disinfecting product to use, add it to the tank and allow it to react with the stored water for 12 to 24 hours. Once the chlorine has completely dispersed throughout the tank and has been allowed to set for another two hours, open the faucet closest to the storage tank and allow the water to run until you smell chlorine (bleach). Immediately turn off this faucet and move to the next closest faucet. Repeat the process until all faucets serviced by the tank have been opened, chlorine detected, then shut off. Allow the chlorinated water to react with the distribution system for an additional 12 to 24 hours.

Using Water from Treated Tanks

Once reaction times have expired, reopen all water faucets, beginning with the faucet farthest from the storage tank and working back toward the tank. Run each faucet until you can no longer smell chlorine bleach. If the chlorine smell remains strong and does not appear to be decreasing, consider obtaining drinking water from another source (for example, bottled water) until chlorine levels have dissipated sufficiently. Chlorinated water may be used for purposes other than consumption to help speed up the dissipation process. However, do not allow highly concentrated chlorinated water to enter septic systems. Water high in chlorine can harm microbial populations in a septic tank. Care also should be taken when using such water for irrigation to ensure that sensitive vegetation is not affected.

Have Water Samples Analyzed

To ensure that all bacteria have been properly destroyed by the sanitation process, submit water samples from a faucet served by the storage tank to a laboratory approved for bacterial analysis of drinking water. Contact your local Texas Cooperative Extension office or county health department to locate an approved water-testing laboratory in your area.

Use Caution When Handling Chlorine Products

Remember, chlorine is volatile. Work in a well-ventilated area when handling or mixing chlorine solutions. Always wear eye protection, rubber gloves, long pants, and a long-sleeved shirt when handling and mixing chlorine. To introduce chlorine into a storage tank, particularly when using dry power or tablet forms, place the desired amount of chlorine into a 5-gallon bucket and fill the bucket with clean water. Thoroughly mix together the chlorine and water before pouring the entire contents of the bucket into the storage tank.

Subsequent Treatments

Finally, note that the first treatment of water with chlorine may not kill all bacteria. Subsequent treatments may be required to kill them all. If bacterial contamination continues, seek professional help to locate the potential source of contamination and/or methods to treat the water continuously to eliminate harmful bacteria effectively. To determine if bacterial contamination has been eliminated, submit a well-water sample to an approved bacteria-testing laboratory. For a list of approved labs, contact your local health department or Texas Cooperative Extension office.

References

Water Quality Improvements for Farmstead and Rural Home Water Systems, D-1252, October 1989, Texas Cooperative Extension, Texas A&M University, College Station, TX.

Shock Chlorination of Wells, L-5441, June 2003, Texas Cooperative Extension, Texas A&M University, College Station, TX.

How to Shock Chlorinate Your Private Water Supply (e-publication), 2003, Wilkes University, Wilkes-Barnes PA.

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Texas Water Resources Institute
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