



Friesen Drillers Ltd.

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Shock Chlorination

Shock chlorination is a relatively inexpensive and straightforward procedure used to disinfect water wells. Many types of bacteria can contaminate wells, but the most common are iron and sulfate-reducing bacteria. Although not a cause of health problems in humans, bacteria growth will coat the inside of the well casing, water piping and pumping equipment, creating problems such as:

- Restricted water flow in distribution lines
- Staining of plumbing fixtures and laundry
- Plugging of water treatment equipment
- Rotten egg odor.

Bacteria may be introduced through a variety of means. However, iron and sulfate-reducing bacteria (as well as other bacteria) can exist naturally in groundwater.

A well creates a direct path for oxygen to travel into the groundwater where it would not normally exist. When a well is pumped, the water flowing in will also bring in nutrients that enhance bacterial growth. Wells can also be contaminated with harmful bacteria such as fecal coliforms or *E. coli*. Shock chlorination is the most effective method to disinfect a water well.

Note: All iron staining problems are not necessarily caused by iron bacteria. The iron naturally present in the water can be the cause.

Signs of iron and sulfate-reducing bacteria

There are a number of signs that indicate the presence of iron and sulfate-reducing bacteria. They include:

- Slime growth
- Rotten egg odor
- Increased staining.

Slime growth

The easiest way to check a well and water system for iron bacteria is to examine the inside surface of the toilet flush tank. If you see a greasy slime or growth, iron bacteria are probably present. Iron bacteria leave this slimy by-product on almost every surface the water is in contact with.

Rotten egg odor

Sulfate-reducing bacteria can cause a rotten egg odor in water. Iron bacteria aggravate the problem by creating an environment that encourages the growth of sulfate-reducing bacteria in the well. Sulfate-reducing bacteria prefer to live underneath the slime layer that the iron bacteria form. Some of these bacteria produce hydrogen sulfide gas as a by-product, resulting in a "rotten egg" or sulfur odor in the water. Others produce small amounts of sulfuric acid that can corrode the well casing and pumping equipment.

Increased staining problems

Iron bacteria can concentrate iron in water sources with low iron content. It can create a staining



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problem where one never existed before or make an iron staining problem worse as time goes by.

Shock Chlorination Purpose

Shock chlorination is used to control iron and sulfate-reducing bacteria and to disinfect a water system. To be effective, shock chlorination should be done on a regular basis at least once or twice per year as part of a routine well maintenance program. Start the treatments early in the life of your well. Shock chlorination will disinfect the following:

- The entire well depth
- The formation around the bottom of the well
- The pressure system
- Some water treatment equipment
- The distribution system. (piping within the home and to the well)

To accomplish this, a large volume of chlorinated water is siphoned down the well to displace all the water in the well and some of the water in the formation surrounding the well.

Effectiveness of shock chlorination

With shock chlorination, the entire system (from the water-bearing formation, through the well-bore and the distribution system) is exposed to water which has a concentration of chlorine strong enough to kill iron and sulfate reducing bacteria (see Figure 1, Water System). Bacteria collect in the pore spaces of the formation and on the casing or screened surface of the well. To be effective, you must use enough chlorine and water mixture to reach and disinfect the entire cased section of the well and adjacent water-bearing formation.

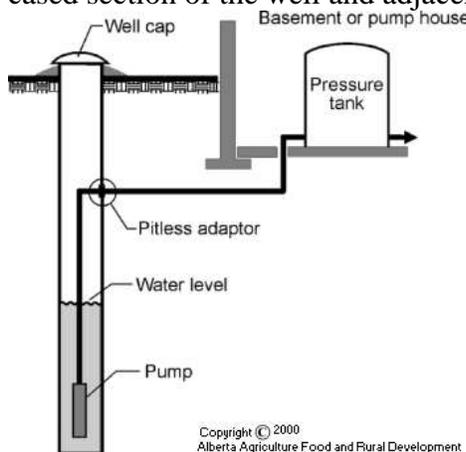


Figure 1 Water System

The procedure described on the following pages does not completely eliminate iron bacteria from the water system, but it will hold it in check. To control the iron bacteria, you will have to repeat the treatment on a regular basis, likely each spring and fall as a regular maintenance



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procedure. If your well has never been shock chlorinated or has not been done for some time, it may be necessary to use a stronger chlorine solution, applied two or three times, before you notice a significant improvement in the water.

* IMPORTANT NOTICE:

Shock chlorination will not be effective on wells that have seldom or never been treated. These poorly maintained wells will likely require the services of an experienced water well driller or plumber who has the necessary equipment and products to effectively and safely clean and restore the well water quality and production. It is also important to note if this procedure has not been done for a number years as the pump and well casing may have sufficient build up that once released by the process, may plug the pump.

Shock chlorination will not eliminate a bacteria problem from a well that is continuous feeding. For example; if a hook up is leaking a shock chlorination will not repair the problem. If a second test results positive for bacteria you should contact a driller for advice.

Caution: If your well is low yielding or tends to pump any silt or sand, you must be very careful using the following procedure because over-pumping may damage the well. When pumping out the chlorinated solution, monitor the water discharge for sediment.

Shock Chlorination Method

Amount of Chlorine for well based on 5" diameter:

Depth: Up to 100 ft. 3 Gallons 120 ft. – 180 ft. 4 Gallons 180-250 ft. 5 Gallons

Generic household bleach such as Javex or similar that are non-high efficiency (HE) is the recommended chlorine for this procedure.

¹ Domestic chlorine bleach should not have additives or perfumes. The use of HE Chlorine must be avoided as it contains soaps. Other chlorines may be used such as pool treatment chlorine and industrial. Be sure to ask the supplier for pertinent information on product purchased.

² If a dry chemical is being used such as granules or pellets, it should be mixed with water to form a chlorine solution of 50 PPM before placing it in the well. See siphoning figure illustrated below. See manufacturer's label for dilution instructions.

Steps to Chlorinate well –

- Step 1-** Store enough water to last for 8-12 hrs. for the household or farm (overnight is least disruptive to the household. Do not drink water while chlorine is in the system)
- Step 2-** Use appropriate level of Chlorine as calculated above
- Step 3-** Pour Chlorine down well head and circulate with water from a garden hose until bleach odor is present at well head.
- Step 3 -** Open each hydrant and faucet in the distribution system (including all appliances that use water such as dishwasher, washing machine, furnace humidifier) until the water coming out has a chlorine odor. This will ensure all the plumbing fixtures are chlorinated. Allow the hot water tank to fill completely. Consult your water treatment



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equipment supplier to find out if any part of your water treatment system should be bypassed, to prevent damage. Water softeners must be bypassed.

- Step 5** - Leave the chlorine solution in the well and distribution system for 8 to 48 hours. The longer the contact time, the better the results. Chlorines caustic properties make it unsafe to leave in the system for longer than a few days, as it will eat fittings, pipes & pump parts.
- Step 6** - Open an outside tap and allow the water to run until the chlorine odor is greatly reduced. Make sure to direct the water away from sensitive plants or landscaping.
- Step 7** - Flush the chlorine solution from the hot water heater and household distribution system. The small amount of chlorine in the distribution system will not harm the septic tank. (Open all faucets and flush toilets, run an empty load through washing machine etc.)
- Step 8** - Backwash and regenerate any water treatment equipment.

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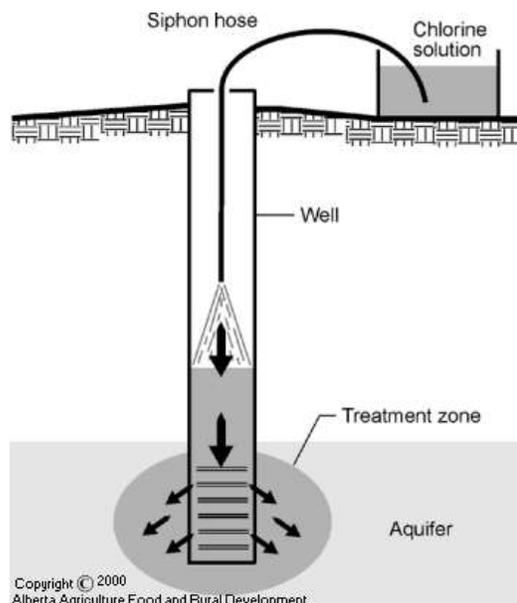


Figure 2 Siphoning Chlorine Solution

**All images courtesy of Alberta Agriculture Food and Rural Development.*

Please check our website: www.friesendrillers.com for additional well information.

water... the lifeblood of the land