

# High Level Chlorine Well Disinfection (Shock Disinfection)

(For Private Water and Health Regulated Public Water Supplies)

## Acknowledgement:

This Fact Sheet is one of a series developed by an Interagency Committee with representatives from Saskatchewan Health, Regional Health Authorities, Saskatchewan Watershed Authority, Saskatchewan Agriculture and Food, Agriculture and Agri-Food Canada – PFRA and Saskatchewan Environment.

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Disinfection is routinely used to control bacteria in wells and is applied as part of a start-up procedure for newly constructed wells and should be used as semi-annual maintenance for existing wells. Disinfection should also be performed in the event of contamination (e.g.: flooding or unacceptable levels of bacterial growth, see *Coliform Bacteria Fact Sheet*). Disinfection can be performed by two methods, low or high level chlorine disinfection. High level chlorine disinfection is the preferred option. However, if proper equipment (e.g. 1360 litres [300 gallon] tank) is not available then low level disinfection (see Low Level Well Disinfection Fact Sheet) may be adequate.

Until the disinfection procedure has eliminated the bacterial contamination, an alternate source of safe water should be used or the water boiled for 1 minute, at a rolling boil, before use. In addition, if possible, identify and eliminate the source of contamination.

## Materials Required

- A clean water tank with a holding capacity of at least 1360 litres (300 gallons);
- Garden hose; and
- 20 litres of industrial strength chlorine (12% sodium hypochlorite) – available from any chemical dealer, water treatment supplier, or dairy supply retailer.

## Procedure

1. Follow chlorine manufacturer's instructions for use. Chlorine concentrations at this level are dangerous. Avoid contact with skin, inhaling the fumes and wear protective clothing/eye wear. If your well is located in a pit, you must make sure there is proper ventilation during the chlorination procedure. It is recommended that you contract the services of a licensed well driller who has the proper equipment and experience to do the job safely.
2. Ventilate confined spaces, e.g., well pit, crawl space, and all other confined spaces where potentially dangerous levels of vapours may accumulate.
3. Do **not** run chlorinated water through certain types of water treatment equipment (e.g., softeners, carbon filters, reverse osmosis systems). For specific information, contact your equipment dealer or Saskatchewan Watershed Authority.
4. The disinfection treatment will require the well to be taken out of service. Therefore, store enough water to meet all necessary requirements for a minimum 12-hour period.
5. Fill the water tank to a minimum of 1360 litres (300 gallons) with water from the well.
6. After drawing water from the well, allow the well to recover to its static (non-pumping) level.
7. Slowly add 10 litres of the chlorine solution (12% sodium hypochlorite) to the well through the garden hose extended as far down the well as possible. If a well is slow yielding or tends to pump any sediment, slowly siphon the solution down the well and pump it out very slowly. Over pumping the well may worsen the sediment problem.
8. Add the remaining 10 litres of the 12% sodium hypochlorite to the tank of water.
9. Slowly add the water with chlorine from the tank to the well.
10. Start the pump and bleed air from the pressure tank. Open each tap and allow the water to run through all taps until a smell of chlorine is detected, then turn off the taps.
11. Turn entire system off for at least 12 hours. Chlorine can be very corrosive if left in the water distribution system for an extended period of time

12. After at least 12 hours, flush the system by pumping the well water through an outside hose (do not exceed the well pumping rate - over pumping the well may worsen any sediment problem), away from grass, shrubs, trees and other sensitive plants until the strong smell of chlorine disappears. Make certain that the water does not enter any watercourse. Finally, open the indoor taps until the system is completely flushed. Return the system to normal operation. Please note that chlorine can react with organics or other substances to produce by-products in certain cases, therefore it is important to flush the well prior to returning it to service.
13. If high level disinfection is being used to eliminate a bacterial problem, verify that the procedure has removed the bacteria by following the steps under Disinfection Verification.

## Disinfection Verification

- Until water testing indicates that the water is safe to use, find another source of water, or boil the water for one minute, at a rolling boil, before consuming. This precaution is particularly important for persons who are immunocompromised and also if the water is being used for infant feeding (preparing formula, etc.).
- For **private water supplies**, it is recommended that a sample be taken five days after treatment and another twelve days after treatment with at least one week of constant use. Two consecutive 'safe' test results are required to ensure that the treatment was effective.
- For **Health regulated public water supplies**:
  - wells not receiving continuous treatment require a sample taken five days after treatment and another twelve days after treatment with at least one week of constant use,
  - wells receiving continuous disinfection treatment require at least two consecutive sets of samples. The samples should be taken at least one day after the treatment and one day apart. Health Region officials will be advising the owner/operator of the supply on number of samples, sampling locations and when the water supply can be used again for human consumption.
  - In general, all private systems should be analysed at least once a year or whenever there is reason to believe that the water supply may have become contaminated (e.g. flooding).
  - Health regulated public water supplies must sample as required by the health region.

## Alternatives

### Health Regulated Public Water Supply

If high level disinfection fails to correct the problem in a health regulated public water supply, contact your local Health Region Public Health Inspector for further assistance.

### Private Water Supply

If high level disinfection fails to correct the problem in a private water supply, it is suggested that you contact the local offices of PFRA, Saskatchewan Watershed Authority, Saskatchewan Groundwater Association, or a Professional Engineer or Geoscientist for further assistance.

## Need More Information?

<b>Government of Saskatchewan</b> Water Information website <a href="http://www.SaskH2O.ca">www.SaskH2O.ca</a>	<b>Water Inquiry Line</b> Questions about water? Call 1-866-SASK H2O (1-866-727-5420) to be referred to proper agency.
<b>Saskatchewan Ministry of Health</b> <a href="http://www.health.gov.sk.ca/environmental-health">http://www.health.gov.sk.ca/environmental-health</a> <b>Regional Health Offices</b> Saskatoon: Saskatoon (306) 655-4605 Sunrise: Yorkton (306) 786-0600 Kelsey Trail: Melfort (306) 752-6310 Five Hills: Moose Jaw (306) 691-1500 Sun Country: Weyburn (306) 842-8618	<b>Saskatchewan Watershed Authority,</b> Head Office, Moose Jaw (306) 694-3900 Website: <a href="http://www.swa.ca">www.swa.ca</a> <i>Regional Offices:</i> <a href="http://www.swa.ca/AboutUs/Contact.asp?type=Offices">http://www.swa.ca/AboutUs/Contact.asp?type=Offices</a> <b>Sask Water Corporation</b> Head Office, Moose Jaw Customer Service 1-888-230-1111 Website: <a href="http://www.saskwater.com">http://www.saskwater.com</a>

<p>Heartland: Rosetown (306) 882-6413  Prairie North: North Battleford (306) 446-6400  Prince Albert Parkland: Prince Albert (306) 765-6600  Cypress: Swift Current (306) 778-5280  Regina Qu'Appelle: Regina (306) 766-7755  Mamawetan Churchill River: La Ronge (306) 425-8512  Keewatin Yatthe: Buffalo Narrows (306) 235-5811</p>	<p><b>Prairie Farm Rehabilitation Administration (PFRA)</b> - Agriculture and Agri-Food Canada  Website <a href="http://www.agr.gc.ca/pfra/water/intro_e.htm">http://www.agr.gc.ca/pfra/water/intro_e.htm</a>  <i>Regional Offices:</i>  <a href="http://www.agr.gc.ca/pfra/sask_e.htm">http://www.agr.gc.ca/pfra/sask_e.htm</a></p>
<p><b>Saskatchewan Ministry of Health</b>  <b>Saskatchewan Disease Control Laboratory, Regina</b>  General Inquiry 1-866-450-0000  Phone: (306) 798-2125 // Fax (306) 798-0071  Website: <a href="http://www.health.gov.sk.ca/lab">http://www.health.gov.sk.ca/lab</a></p>	<p><b>Saskatchewan Ministry of Agriculture</b>  General Inquiry 1-866-457-2377  Agricultural Operations Regina (306) 787-4680  Irrigation Development Outlook (306) 867-5500  Website: <a href="http://www.agriculture.gov.sk.ca">www.agriculture.gov.sk.ca</a></p>
<p><b>Health Canada</b>  First Nation and Inuit Health Branch, Regina  (306) 780-5434  Website: <a href="http://www.hc-sc.gc.ca">http://www.hc-sc.gc.ca</a></p>	<p><b>Saskatchewan Ministry of Environment</b>  Toll-Free 1-800-567-4224  Spill Emergency Toll-Free 1-800-667-7525  Website: <a href="http://www.environment.gov.sk.ca">http://www.environment.gov.sk.ca</a></p>