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**WELL DISINFECTION INSTRUCTIONS**

WELL CASINGS, PUMPS, STORAGE TANKS AND THE WATER DISTRIBUTION PIPING OF THE ENTIRE SYSTEM MUST BE DISINFECTED AFTER EACH REPAIR OR MAINTENANCE, OR WHEN THE TOP OF THE WELL CASING HAS BEEN FLOODED WITH SURFACE WATER.

- All new, repaired or altered private water systems must be disinfected with chlorine prior to being used for human consumption.
- The person performing construction, alteration or repair must disinfect the system upon completion of work.
- It is the owner’s responsibility to ensure that the entire system, including plumbing and fixtures, is disinfected prior to placing the system into service.

WHAT TO USE: UNSCENTED LAUNDRY BLEACH; OR CALCIUM HYPOCHLORITE PELLETS OR GRANULES

**DISINFECTION PRODUCTS AND CHLORINE CALCULATION**

1. Sodium hypochlorite is a liquid form commonly known as laundry bleach. It has 5.25% free available chlorine and a pH of 12.8; Calcium hypochlorite is available in granular or palletized form. It has 68% free available chlorine and a pH of 7.0-7.1.
2. Quantity of chlorine solutions necessary to disinfect a private water system must be calculated based on the total volume of water in the borehole of a well, as well as iron, manganese, and sulfur. These will react with the chlorine and reduce the free chlorine residual.
3. Calculate the volume of chlorine product to be added to achieve a concentration of:
  - a. 250 mg/L (ppm) for new well construction
  - b. 500 mg/L (ppm) for well alterations
  - c. 1000 mg/L (ppm) for cisterns, springs, hauled water storage tanks, dug wells
4. Determine the volume of water in the well and service lines.
5. To calculate, subtract the static level depth from the total well depth. Multiply the volume of water in the well (refer to Table 1) by the length of water in well casing (static subtracted from total depth). Add to that the volume of water in the home’s service lines. The average home’s water line and fixture capacity is 100 gallons. Based on this number, refer to Table 2 for the amount of chlorine to add to well.  
**FOR EXAMPLE:** a 6-inch casing has a pre-pumping static level of 70 ft.; the total depth of the well is 165 ft. The total depth of water in the well then is 95 ft. Referring to Table 1, for a 6-inch casing, the gallons per foot of water are 1.5. This multiplied by 95 equals 137.5 gallons of water in the well. 137.5 plus 100 gallons in the service lines equals 237.5 gallons of water. Table 2 then shows how much chlorine should be added for every 100 gallons of water.
6. In a 5-gallon bucket filled with water, determine the pH of the water using a pH test kit. Add distilled white vinegar to the water until pH is between 4 and 5. Once achieved, add calculated amount of chlorine and continue with disinfection instructions.
7. You should not need any more than 2 gallons of bleach, or 1 lbs. Dry calcium hypochlorite to disinfect the entire system.

**TABLE 1. VOLUME OF WATER IN WELL**

| DIAMETER OF WELL (INCHES) | GALLONS PER FOOT OF WATER |
|---------------------------|---------------------------|
| 3                         | 0.37                      |
| 4                         | 0.65                      |
| 5                         | 1.0                       |
| 6                         | 1.5                       |
| 8                         | 2.6                       |

**TABLE 2. AMOUNT OF CHLORINE ADDED TO 100 GALLONS FOR WATER FOR DISINFECTION**

| CHLORINE CONCENTRATION (PARTS PER MILLION) | GALLONS OF 5.25% SODIUM HYPOCHLORITE (LIQUID BLEACH) | POUNDS OF DRY CALCIUM HYPOCHLORITE | MINIMUM CONTACT TIME |
|--|--|------------------------------------|----------------------|
| 250  | 0.5  | 0.38                               | 8 HOURS              |
| 500  | 1  | 0.75                               | 8 HOURS              |

## **DISINFECTION**

1. For new wells, properly develop the well to remove all sediment and fine materials. For alterations, use tools or chemicals, as necessary, to remove all mineral encrustation and bacterial slime from the walls of the casing and borehole, and remove all sediment accumulated in the bottom of the borehole.
2. Calcium hypochlorite pellets or granules must be dissolved in water prior to disinfection.
3. By-pass the water softener and remove all filter cartridges prior to disinfection. Softener must remain on bypass until water sample has been collected. Add ¼ cup unscented laundry bleach directly to the brine tank to disinfect water softener, then manually regenerate before or after disinfection. Remove cartridge filters and disinfect housing of filter systems.
4. Remove well cap, vent pipe, or plug, if the well is equipped with a sanitary well seal.
5. Pour the chlorine solution into the well, or place from the bottom of the well upward using a tube.
6. Surge or agitate the well to ensure even dispersal of the chlorine solution throughout the well.
7. Attach a garden hose to the nearest hose faucet and extend the hose to the top of the well casing. Recirculate the water in the well and wash down the sides of the casing for a minimum of ten (10) minutes. The hose may also be placed below the water level, as far as it will reach, preferably to the bottom of the well. This will help ensure that chlorine has reached below the pump. Slowly draw the hose up and down the well.
8. Turn off the hose faucet and remove the hose from the well casing. Replace the well cap or plug.
9. Circulate the chlorinated water through the service lines and plumbing, if present. Bring chlorine solution in ENTIRE system: Hot, Cold, Shower, Toilets, Pressure tank, Outside Spigots, etc. Do not skip any taps.
10. Run EVERY inside and outside faucet until you smell bleach, then immediately turn off.
11. Check chlorine residuals with test strips or kit.
12. Let chlorinated water stand in well and plumbing for a minimum of eight (8) hours.
13. For older hot water heaters, prior to disinfection, turn off, drain and flush hot water heater. Refill with full strength chlorine solution; check for pressure relief valve. Turn up hot water temperature to 160° F. After flushing well, turn off water heater and drain. Turn down water temperature. This will rid hot water heater of sediment at bottom of tank. For newer hot water heaters, simply pass chlorinated water through by opening hot water taps throughout the house, or building.
14. After contact time has elapsed, discharge all water until the odor of chlorine disappears. This may take several hours.
15. **Call the Health Department after disinfection** to have a water sample collected for total coliform bacteria analysis. We cannot collect a sample until we have received the Completion Form for new or altered wells.

## **WATER SAMPLING**

1. If the first water sample is total coliform positive, then the well must be rechlorinated and resampled.
2. If more than two samples are total coliform or *E. coli* positive, then the well must be superchlorinated.
  - To superchlorinate, install an inflatable packer and inject water into the aquifer; OR
  - You may also introduce a volume of pH-adjusted chlorinated water into the well that is 2-3 times the volume of water in the well. This will force chlorinated water into the aquifer.
3. If the sample is total coliform positive or *E. coli* positive after superchlorination, the Ohio Department of Health shall be notified, and an investigation of the private water system will be conducted to determine the source of contamination.

**EFFECTIVE OCTOBER 1, 2001:** There will be a laboratory and sample collection fee charged per sample for wells that must be sampled more than twice. The system cannot be approved until all paperwork is submitted and the water is total coliform negative.