Centers for Disease Control and Prevention
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Emergency Disinfection of Drilled or Driven Wells

Safety Precautions

Clear hazards away from wells before cleaning and disinfecting wells after floods and other natural disasters. Follow these precautions:

- Turn off all electricity to the well area before clearing debris. Do not attempt to repair the water system unless you are experienced with this type of work: electrical shock can occur. Inspect all electric connections for breaks in insulation and for moisture: connections must be dry and unbroken to avoid shock.
- Carefully inspect the area around the well for hazards such as power lines on the ground or in the water; sharp metal, glass, or wood debris; open holes; and slippery conditions.
- Do not enter the well pit. Gases and vapors can build up in well pits, creating a hazardous environment.
- Before the power is turned back on, a qualified electrician, well contractor, or pump contractor may need to check the equipment wiring system.
- Wear protective goggles or a face shield when working with chlorine solutions. Note that chlorine solutions may irritate skin and damage clothing.
- When mixing and handling chlorine solutions, work in well-ventilated areas and avoid breathing vapors.
- Warn users not to drink or bathe in water until all the well disinfection steps have been completed and the well has been thoroughly flushed and testing indicates it is safe to use.

Disinfection of Drilled or Driven Wells

Follow these steps:

1. If the well is equipped with an electrical pump, turn off all electricity and clear debris from around the top of the well.
2. Repair the electrical system and pump if needed. Contact a qualified electrician, well contractor, or pump contractor if you are not experienced with this type of work.
3. Start the pump and run water until it is clear. Use the outside faucet nearest to the well to drain the potentially contaminated water from the well and keep the unsafe well water out of the interior household plumbing. If no pump is installed, bail water from the well with a bucket or other device until the water is clear.
4. If the well is connected to interior home plumbing, close valves to any water softener units.
5. Use Table 2 (#table_two) to determine the amount of liquid household bleach (5%-6%) needed to disinfect the well. Use only unscented bleach. For a table in metric units, please see Table 2.1: Approximate Amount of Bleach for Disinfection of a Drilled or Driven Well (Metric) (/healthywater/emergency/safe_water/wells/disinfection_wells_drilled_bleach_table_metric.html).

Table 2. Approximate Amount of Bleach for Disinfection of a Drilled or Driven Well

Depth of Water	Diameter of Well Casing						
	2 inches	4 inches	6 inches	8 inches	10 inches	24 inches	36 inches
10 feet	3/4 tbsp	3-1/4 tbsp	1/2 cup	3/4 cup	1-1/4 cups	7 cups	1 gal
20 feet	1-1/2 tbsp	6-1/2 tbsp	1 cup	1-1/2 cups	2-1/2 cups	14 cups	2 gal
30 feet	2-1/4 tbsp	9-3/4 tbsp	1-1/2 cups	2-1/4 cups	3-3/4 cups	1-1/4 gal	3 gal
40 feet	3 tbsp	13 tbsp	2 cups	3 cups	5 cups	1-3/4 gal	4 gal
50 feet	3-3/4 tbsp	1 cup	2-1/2 cups	3-3/4 cups	6-1/4 cups	2-1/4 gal	5 gal
100 feet	7-1/2 tbsp	2 cups	5 cups	7-1/2 cups	12-1/2 cups	4-1/2 gal	10 gal

Notes:

- Use only unscented household liquid chlorine bleach.
- Bleach concentrations can vary between 5% and 6%.
- Quantities given in this table are approximate and are rounded to the nearest practical measurement. Amounts given are calculated in accordance with reaching a chlorine concentration of 100 mg/L

Key:

- tbsp: tablespoon
- gal: gallon
- 1 cup = 8 fluid ounces = 16 tablespoons
- 1 gallon = 16 cups

6. Using a 5-gallon bucket, mix the bleach from Table 1 with 3-5 gallons of water (12-19 liters).
7. Remove the vent cap.
8. Pour the bleach water mixture into the well using a funnel. Avoid all electrical connections. Attach a clean hose to the nearest hose bib and use it to circulate water back into the well for thorough mixing.
9. Rinse the inside of the well casing with a garden hose or bucket for 5-10 minutes.
10. Open all faucets inside the home and run the water until you notice a strong odor of chlorine (bleach) at each faucet. Turn off all faucets and allow the solution to remain in the well and plumbing for a minimum of 12 hours.
11. After at least 12 hours, attach a hose to an outside faucet and drain the chlorinated water onto a non-vegetated area such as a driveway. Continue draining until the chlorine odor disappears. Avoid draining into open sources of water (streams, ponds, etc.).
12. Turn on all indoor faucets and run water until the chlorine odor disappears.
13. Until well water has been tested, boil it (rolling boil for 1 minute) before use or utilize an alternative water source should be used. Wait at least 7-10 days after disinfection, then have the water in your well sampled. Water sampling cannot be done until all traces of chlorine have been flushed from the system.

Sampling After Disinfection

- Wait at least 7 to 10 days to test the water after disinfection to ensure that the chlorine has been thoroughly flushed from the system.
- Contact your local health department for water sampling and testing information or contact your state laboratory certification officer to find a certified lab near you. You can also get this number from the U.S. Environmental Protection Agency's Safe Drinking Water Hotline (http://www.epa.gov/safewater/labs/) (http://www.cdc.gov/Other/disclaimer.html) (800-426-4791).
- Sample the water for total coliform and either *E. coli* or fecal coliform bacteria to confirm that the water is safe to drink.
- If results show no presence of total coliforms or fecal coliforms, the water can be considered safe to drink from a microbial standpoint.
- Follow up with two additional samples, one in the next 2 to 4 weeks and another in 3 to 4 months.
- Check the safety of your water over the long term: continue to monitor bacterial quality at least twice per year or more often if you suspect any changes in your water quality.

If results show the presence of any coliform bacteria, repeat the well disinfection process and resample. If tests continue to show the presence of bacteria, contact your local health department for assistance.

Disinfection Issues and Concerns

Water softeners may be damaged by the disinfection process because of the large amounts of chlorine used. Follow your manufacturers' instructions for appropriate methods to disinfect your softener unit. You may need to bypass the unit until the disinfection process is complete.

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Water-Related Emergencies & Outbreaks

Approximate Amount of Bleach for Disinfection of a Drilled or Driven Well (Metric)

Table 2. Approximate Amount of Bleach for Disinfection of a Drilled or Driven Well (Metric)

Depth of Water	Diameter of Well Casing						
	5 cm	10 cm	15 cm	20 cm	25 cm	0.6 m	0.9 m
3 m	12 mL	48 mL	118 mL	177 mL	296 mL	1.66 L	3.78 L
6 m	24 mL	96 mL	236 mL	354 mL	592 mL	3.32 L	7.56 L
9 m	36 mL	144 mL	354 mL	531 mL	888 mL	4.98 L	11.34 L
12 m	48 mL	192 mL	472 mL	708 mL	1.18 L	6.64 L	15.12 L
15 m	60 mL	240 mL	590 mL	885 mL	1.48 L	8.30 L	18.90 L
30 m	120 mL	480 mL	1.18 L	1.77 L	2.96 L	16.60 L	37.80 L

Notes:

- Use only unscented household liquid chlorine bleach.
- Bleach concentrations can vary between 5% and 6%.
- Quantities given in this table are approximate and are rounded to the nearest practical measurement. Amounts given are calculated in accordance with reaching a chlorine concentration of 100 mg/L

Key:

- cm: centimeter
- m: meter
- 1 m = 100 centimeters
- mL: milliliter
- L: liter
- 1 liter = 1000 milliliters

For information in United States measurements, please see Table 2. Approximate Amount of Bleach for Disinfection of a Drilled or Driven Well.

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