



County of San Diego

Department of Environmental Health and Quality

Land and Water Quality Division

5500 Overland Avenue, Suite 210 San Diego, CA 92123
(858) 565-5173 | lwq-duty.deh@sdcounty.ca.gov | www.sdcdehq.org

Well Disinfection

Individual water wells may incur contamination as a result of fire damage to components and/ or the need to reopen the well to replace water lines to the well. Once all repair work is completed to the well and water lines, the well should be disinfected and water samples taken to a State Approved Laboratory for testing. Refer to the DEHQ [Private Well Water Quality Sampling Guidance](#) for information on sampling.

Exposed piping, electrical supply lines, storage tanks and other surface exposed components of the water supply system may be damaged or destroyed by fire. It is strongly suggested that the water well disinfection procedures outlined below be implemented after repairs to the potable water distribution system have been completed. It is also recommended that a water sample be taken and submitted to a state certified laboratory for analysis. This is to ensure that any contamination that may have entered the well as a result of the damage has been eliminated.

WATER WELL DISINFECTION

Disinfection involves seven steps:

1. A chlorine solution containing at least 50 mg/l (or parts per million) available chlorine is added to the well. The table below lists quantities of various chlorine compounds required to disinfect 100-feet (30-meters) of water filled casing at 50 mg./l for diameters ranging from 2 to 24 inches (50 to 600 millimeters). Chlorine concentration can be easily measured with a simple pool test kit, if available.
2. If the well pump requires removal for repair or replacement, the pump and discharge pipe should be washed with a chlorine solution as it is lowered into the well.
3. After it has been placed into position, the pump shall be turned on and off several times (e.g. "surged") to thoroughly mix the disinfectant with the water in the well. Repeat this procedure several times at one-hour intervals.
4. Pump until the water discharge has the odor of chlorine. This chlorinated water should be pumped through the entire distribution system.
5. The well and associated piping should be allowed to stand without pumping for 24-hours.

6. Chlorine required to disinfect 100 feet of well casing or water pipe @ 50 MG/L (parts per million):

Diameter of Casing In. (mm)	(70%) Calcium Hypo chlorite	(25%) Chloride of Lime	(5.25%) Sodium Hypo chlorite (Liquid Measure)
2 (50)	¼ oz. (7 g)	½ oz. (14 g)	2 oz. (59 ml)
4 (100)	1 oz. (28 g)	2 oz (57 g)	9 oz (266 ml)
6 (150)	2 oz. (57 g)	4 oz. (113 g)	20 oz. (0.6 l)
8 (200)	3 oz. (85 g)	7 oz. (0.2 kg)	2 ½ pts (1.0 l)
10 (250)	4 oz. (113 g)	11 oz. (0.3 kg)	3 ½ pts (1.7 l)
12 (300)	6 oz. (0.2 kg)	1 lb. (0.45 kg)	5 pts (2.4 l)
16 (400)	10 oz. (0.3 kg)	2 lb. (0.9 kg)	1 gal (3.8 l)
20 (510)	1 lb. (0.45 kg)	3 lb (1.4 kg)	1 2/3 gal (6.3 l)
24 (610)	1 ½ lb (0.7 kg)	4 lb. (1.8 kg)	2 1/3 gal (98.8 l)

7. The water shall then be pumped to waste until the presence of chlorine is no longer detectable. The absence of chlorine is best determined by testing for available chlorine residual using a test kit designed for this purpose.

The chlorinated waste should not be discharged directly to sensitive landscaped areas, storm sewers, or drainage ditches, and should never be discharged to creeks, streams or environmentally sensitive habitats. Ideally, the chlorinated waste should be drained to a flat or gently sloped area where it can infiltrate into the soil. Also note that heavily chlorinated water should not be disposed of through the plumbing systems of homes that utilize individual sewage disposal systems (septic tanks). Such strong disinfectants could neutralize the bacteria needed to stabilize the sewage and also could damage the soil absorption system.

(Optional) A bacteriological sample should be taken and submitted to a laboratory for examination.

If the laboratory analysis shows the water is not free of bacterial contamination, the disinfection procedure should be repeated. Depending on the level of contamination, it may be necessary to use a higher concentration chlorine solution (several times that shown in the table). The water should be retested. If the repeated attempts to disinfect the well are unsuccessful, a detailed investigation to determine the cause of the contamination should be undertaken.

When small individual domestic wells to be treated are of unknown depth or volume, at least one pound (0.45 kilograms) of calcium hypo chlorite (70% available chlorine) or two gallons (7.5 liters of household bleach (sodium hypo chlorite), such as Clorox or Purex, may be used in lieu of the chemicals shown in the above-referenced table.

Please Note:

- Some authorities recommend a minimum concentration of 100 mg/l. To obtain this concentration, double the amounts shown.
- When dry chlorine is used, dry product should be mixed with water prior to use.

CAUTION: WHEN USING DRY CHLORINE, USE GOGGLES FOR EYE PROTECTION AND WEAR PROTECTIVE CLOTHING AND GLOVES.



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PRIVATE WELL WATER QUALITY SAMPLING GUIDANCE

The County of San Diego requires that all building permit applicants demonstrate that their private water well supply is potable prior to occupancy or change of use. The Department of Environmental Health & Quality (DEHQ) reviews the water testing results submitted by the owner or certified laboratory to verify potable quality for domestic use. However, it remains the responsibility of the private well owner to maintain the ongoing health standards and safety of their water supply.

WELL WATER QUALITY TESTING REQUIREMENTS

At a minimum, testing for bacteria and nitrates is required by an owner or applicant to verify a potable water supply prior to County issuance of a building or septic system permit. If the water sample results do not meet health standards for drinking water, or if an applicant fails to submit water testing results from a private water well, building occupancy will not be granted by the county.

The DEHQ may require additional analyses in limited areas of the county where groundwater contaminants or water quality concerns have been documented or are suspected. Please contact the [Land Use Program Duty Desk](#) at 858-565-5173 for questions on specific well water sampling requirements for your project.

Bacteria Testing

Bacteria testing is for the presence of total coliform and *E. coli* bacteria. Coliform bacteria are a commonly used bacterial indicator of the sanitary quality of water. These bacteria are found in the intestinal tract of humans and animals, and in soil and water that has been subject to contamination from dust, insects, birds, small animals, sewage, or surface drainage. Contamination by these bacteria can occur during construction of water wells or through the repair, maintenance or deterioration of older wells. Absence of coliforms and *E. coli* indicates the water meets bacteriological standards as a potable water source.

Nitrate Testing

Nitrate testing is to ensure that drinking water does not have levels of this chemical that exceed safe drinking water standards. The presence of nitrates in groundwater is generally associated with septic systems, confined animal feeding operations or fertilizer use. A nitrate (NO₃) level in drinking water exceeding 10 mg/L as nitrogen (N) may be hazardous and should not be consumed by pregnant women or infants less than 6 months of age to prevent the possibility of methemoglobinemia (blue baby syndrome). Wells proposed for new construction with nitrate concentrations (as nitrogen) that exceed 10 mg/L will not be approved as a potable water source. There are no nitrate removal systems that are currently allowed by the DEHQ for private water supply wells.

Additional Testing

Well water can also contain contaminants or constituents of concern such as minerals, pesticides, organic chemicals, and radioactive elements. Further information on these contaminants and

recommendations for testing can be found in [A Guide for Private Domestic Well Owners](#) compiled by the California State Water Resources Control Board.

WELL WATER SAMPLE COLLECTION

The DEHQ requires that well water samples be collected by a qualified individual based on California certification or specialized training or experience (e.g. California-certified laboratory staff and certified water system operators). Well owners, homeowners, and well drillers may not collect well water samples for determination of water potability. Please contact the [Land Use Program Duty Desk](#) at 858-565-5173 if you need assistance in identifying a qualified sampling service.

Preparation of Well for Sampling

The well should be carefully inspected to determine if there are any means by which contamination could enter from the surface. An improperly sealed well should not be sampled until necessary repairs are completed. A well repair permit is necessary if major defects need to be corrected by a licensed well drilling contractor or pump installation specialist. Smaller gaps or holes can often be successfully sealed by the homeowner using a commercial, NSF-certified caulking product.

Chlorination, Disinfection, and Dechlorination

All new and repaired wells should be disinfected prior to water sampling. An option for disinfection is the use of a sodium hypochlorite (*NSF Standard 60* chlorine bleach) solution and subsequently dechlorinated prior to water sampling. If sodium hypochlorite is used, it is suggested that the following recommended procedures be followed:

- Pump water from the well until it looks clear.
- Add *NSF Standard 60* chlorine bleach into the well through the access plug on the top of the well seal using a large funnel. Use at least one quart of 5.25% *NSF Standard 60* chlorine bleach per 100 feet of drilled well depth.
- Start the pump and run the water from the closest tap until there is a strong chlorine odor to the water.
- Attach a piece of hose to the tap and circulate the water through the funnel into the well for at least 30 minutes.
- Stop the pump and do not operate the well for at least 24 hours.
- After 24 hours, start the well and pump water until the chlorine odor is gone. Let stand at least 24 hours after determining the chlorine has been removed. A swimming pool test kit can be used to verify the absence of chlorine.

WELL WATER SAMPLE TESTING

The DEHQ requires that well water testing be completed by a certified drinking water laboratory. The California State Division of Drinking Water certifies laboratories and provides information on the nearest Environmental Laboratory Accreditation Program ([ELAP Certified Laboratories](#)) that provides testing for Microbiology (Total Coliform and *E. coli* bacteria) and Inorganic Chemistry (Nitrates) for drinking water.

The DEHQ requires that the laboratory results for Total Coliform and *E. coli* bacteria be reported as **present/absent** and Nitrates in **mg/L as Nitrogen**.

SUBMISSION OF SAMPLING RESULTS

Water testing results must be submitted to the DEHQ within one year of testing for the results to be considered valid. Please email the chain of custody form and official laboratory report with water well sampling results to LWQDuty.DEH@sdcounty.ca.gov or provide the results in person at the DEHQ Land Use Duty Desk located in the Building Permit Center on the first floor at 5510 Overland Avenue, San Diego, California.

Note: The chain of custody form must include sufficient information to verify the validity of the analytical results. At a minimum, the site address, assessor's parcel number, sample location, sample date and time, and the name, qualification, and signature of the person who performed the sampling must be included.

REVIEW OF SAMPLING RESULTS

A water sample will be deemed potable **if no coliform or *E. coli* bacteria are present, the concentration of nitrates (as nitrogen) is not greater than 10 mg/L, and any additional chemical testing results that may be required meet safe drinking water standards (Title 22, California Code of Regulations)**. The DEHQ will provide written notice to the applicant regarding its review of the water potability test results.

If the water sample results do not meet health standards for drinking water, or if an applicant fails to submit water testing results from a private water well, building occupancy will not be granted by the County.

If you have any questions or require additional information regarding private well water sampling, please contact the [Land Use Program Duty Desk](#) at 858-565-5173.