

Health and Bore Water

If reticulated water supply is not available on your property and you are relying on bore water (groundwater) for household use such as drinking, bathing or cooking, the following information may assist you in maintaining a safe water supply.

Groundwater

Excess rainwater that seeps down into the ground until it reaches an area below the water table is called groundwater.

Some rural properties have access to groundwater aquifers that are capable of producing useful supplies of water.

Groundwater can be a safe and reliable water source if it is well maintained and protected from contaminants. There are two types of groundwater supply:

- Shallow groundwater – can be very close to the surface, recharges quickly but prone to contamination from run-off including effluent (septic tank), animal faeces, pesticides and fertilisers;
- Deep groundwater – can be hundreds of meters below the surface, recharges slowly, less prone to contamination from run-off but can contain high levels of minerals.

If you are not sure about the quality of your groundwater supply, consider testing the water prior to use and investigate treatment options including filtration, chlorination or ultraviolet (UV) disinfection.



Protecting bore from contamination

- Ensure your bore is located at least 30 metres from septic tanks or aerobic treatment units and at least 50 metres away from livestock.
- Ensure your bore is constructed by a licensed driller.
- Ensure your bore is installed with a protective cover and is surrounded by a concrete slab, with the wellhead protruding well above the ground. The slab should slope away from the bore so that surface water does not drain into the casing.
- Do not use pesticides near your bore.
- Regularly inspect your bore to check for signs of contamination.

Testing

Gympie Regional Council provides a water sampling service for microbiological and standard water analysis for a [fee](#).

- The **microbiological analysis** is limited to *Escherichia coli* (*E. Coli*) bacteria and thermotolerant coliforms, as indicators of enteric pathogens (faecal contamination).

Microbial quality is the most important factor in determining if water supplies are safe for human consumption. There must not be any *E. Coli* bacteria present in a sample of water to be safe for human consumption.

All microbiological samples are required to be collected by council's Environmental Health Services to prevent the risk of any possible cross contamination. Results are usually available within 3-4 days.

- The **Standard Water Analysis** is limited to physical and chemical parameters of water and includes but is not limited to pH, total hardness, alkalinity, total dissolved solids, turbidity, conductivity, sodium, calcium, fluoride, nitrate, iron, magnesium and other parameters.

A sample of 1L of groundwater can be collected in a clean plastic or glass container and delivered to council's Environmental Health Services.

Alternatively, an approved container can be provided for your use. Results are usually available within 4-6 weeks.

Both types of analysis are performed by the State Government's Forensic and Scientific Services Laboratory. Results are based on values prescribed by the *Australian Drinking Water Guidelines 2011*.

Other National Association of Testing Authorities (NATA) accredited laboratories offering water testing services can be found on the internet.

Treatment

There are several methods for treating water to remove any contaminants that may present a health risk. Some chemical parameters of bore water may need to be adjusted prior to use to meet the values prescribed by the *Australian Drinking Water Guidelines 2011*. Professional advice should be sought for the design and installation of an appropriate water treatment system to suit your family.

Filtration

Filtration will assist in removal of contaminants, for example, sediment, particulate matter, iron and hydrogen sulphide, unpleasant tastes, odours and colour. Depending on the size of the filter membrane (measured in microns) some filters can be capable of removing protozoa (*Giardia*, *Cryptosporidium*), bacteria (*E. Coli*) and some viruses. Activated carbon filters do not remove bacteria or viruses and disinfection will be required as an additional step.

It is imperative that water filters are maintained in accordance with the manufacturer instructions. Water filters should be cleaned or replaced as directed by the manufacturer.

Filters installed to remove a specific contaminant should have been tested to demonstrate their effectiveness against that contaminant.

Ensure that the filtration system carries a standard [WaterMark](#) and complies with at least one of the following standards:

- American National Standards Institute and National Sanitation Foundation (ANSI/NSF) Standard 53; or
- Australian/New Zealand Standard AS/NZS 4348 *Water Supply – Domestic type water treatment appliances – Performance requirements*.

Where the filtration equipment may be subject to normal water mains pressure (i.e. greater than 150 kPa) then the filtration equipment must comply with Australian/New Zealand Standard AS/NZS 3497 - Drinking water treatment units. Contact council's [plumbing section](#) regarding any specific plumbing applications/requirements.



Disinfection

Chlorination

If water is to be pumped to a holding tank and requires disinfection, chlorination is an effective, reliable and inexpensive method. Chlorine-based products provide protection from harmful microorganisms. However, for these products to be effective, some filtration of particulate matter may be required. Some common chlorine products that can be used in water storage tanks:

- four per cent liquid bleach;
- 12.5 per cent liquid sodium hypochlorite;
- 65 per cent granular or powdered calcium hypochlorite.

Normal chlorine concentrations in reticulated drinking water supplies usually range from 0.5 to 1.5 milligrams per litre (mg/L).

It is very important that chlorine is added to water at the correct dosage. Before you start, you will need to estimate the amount of water available in your tank. Try using the following formula to calculate volume:

$$\text{Volume (in litres)} = (3.14 \times \text{radius}[m] \times \text{radius}[m] \times \text{water depth}[m]) \times 1000$$

Once you decide on the type of chlorine you prefer to use, follow manufacturer's instructions and the safety data sheet to dissolve chlorine in cold water in a plastic bucket prior to adding the solution to the holding tank. Use appropriate Personal Protective Equipment (PPE) to ensure safe handling of the chlorine solution.

It is recommended that concentration of 5mg/L of free chlorine is achieved on initial treatment. Let the water stand in the holding tank for at least one hour (ideally 24 hours) after initial treatment and then maintain the level at or below 1mg/L.

A simple test kit to monitor chlorine levels can be purchased where swimming pool supplies are sold (approximately \$30.00). It is recommended that the sample be collected from a tap within the dwelling.

Ensure you purchase a kit that indicates mg/L of free chlorine, as opposed to a kit that does not provide a measurement (i.e. 'too low' 'satisfactory' 'too high'). This is because the acceptable level of free chlorine in swimming pools is too high for drinking water.

The free chlorine level should be checked at least weekly with a test kit and chlorine added as required.

UV disinfection

Ultraviolet light irradiation (UV) is effective against most bacteria, viruses and protozoa.

UV light works by damaging microorganisms' cellular function so that they are not able to grow and multiply. UV systems are most effective when the water is clear and free of particulate matter. Most water supplies will need to be filtered to ensure effective UV treatment. Refer to filtration advice above.

All UV light systems require maintenance (e.g. replacing light lamp once a year or as required). It is recommended that you follow the maintenance procedures specified by the manufacturer or supplier.

Amount of chlorine to add to achieve 5mg/L in tank

Volume of water in tank (litres)	4 per cent liquid bleach (mL)	12.5 per cent liquid sodium hypochlorite (mL)	65 per cent granular or powdered calcium hypochlorite (g)
1000	125	40	8
2000	250	80	15
5000	625	200	38
6000	750	240	46
7500	938	300	58
10,000	1250	400	77
16,000	2000	640	123
20,000	2500	800	154
30,000	3750	1200	231

All UV light disinfection systems sold in Australia are required carry a standard [WaterMark](#) symbol. To ensure the correct level of microbiological removal UV light disinfection systems should also comply with one or more of the following:

- Australian/New Zealand Standard AS/NZS 4348 Water Supply – Domestic type water treatment appliances – Performance requirements
- Australian/New Zealand Standard AS/NZS 3497 Drinking water treatment units – Plumbing requirements. This Standard also specifies the level of performance each water treatment and disinfection system can achieve.
- American National Standards Institute and National Sanitation Foundation (ANSI/NSF) Standard 55.

UV light disinfection systems should be able to treat water to one or more of the following classifications:

Treatment Class	Microbiological Treatment	Level of Disinfection
Class IIa	Bacteria removal	Will remove or inactivate bacteria
Class IIb	Virus removal	Will remove or inactivate viruses
Class IIc	Protozoa removal	Will remove or inactivate Cryptosporidium and Giardia. Will not remove bacteria or viruses unless Class IIa and IIb are passed.



In addition to the above information, consider the following before purchasing a UV disinfection system:

- Determine the volume of water to be treated and ensure the equipment has the capacity (litres per hour) to treat all the water needed for drinking, bathing, cooking;
- Check the system is equipped with a pre-filter to remove any sediment and debris that can interrupt UV light;
- It is recommended that the system has a built in light sensor connected to an alarm system in case of low UV level or loss of power;
- Check the system is connected to a constant power supply.

Additional information

Queensland Health – [Safe water on rural properties](#)

National Health and Medical Research Council (NHMRC) [Australian Drinking Water Guidelines 2011](#)

Western Australia Department of Health – [Bore Water](#)

Contact us

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