

Health and Rainwater Tanks

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

Rainwater tanks

While rainwater tanks provide a renewable supply of fresh water, they require regular maintenance and treatment.

Rainwater collected on the roof comes in contact with organic matter like dust, bird or possum droppings, algae, leaves and other contaminants that accumulate on the surfaces of the roof and gutters. Well maintained rainwater collection systems pose little risk to human health, although the risk increases with less maintenance and lack of cleaning.

Maintenance

It is recommended that rainwater tanks are fitted with a first flush water diverter, which assists in directing the first flush of water away from the rainwater tank. The first flush of water generally contains higher concentrations of contaminants.

Once a rainwater tank is installed, it is recommended that the following maintenance is carried out and tank inspected at least every six (6) months:

- **Roof and gutters** – should be checked and cleaned to remove accumulation for example leaves, algae and bird droppings, or alternatively gutter guards can be installed. Any overhanging tree branches must be periodically pruned to minimise fallen leaf matter and bird droppings.



- **External inspection** – check structural integrity of the tank and repair any holes or gaps, tank inlets must be in good order and insect-proof (1mm mesh), if necessary these should be cleaned and repaired.
- **Internal inspection** – check for evidence of access by animals, birds or insects including the presence of mosquito larvae. If present, identify and close access points. If there is any evidence of algal growth, find and seal points of daylight entry.
- **Sediment** – every 2-3 years, check for the presence of accumulated sediments. If the bottom of the tank is covered with sediment, the tank should be cleaned.

Rainwater tanks can become a significant mosquito breeding site when they fall into disrepair. Tanks that are no longer required should be drained (i.e. by drilling holes on the bottom), cut up and removed to an appropriate waste disposal site.

Water quality

Rainwater collected off the roof will contain a range of microorganisms from one or more sources. While some microorganisms are naturally present in the environment and harmless, others are capable of causing adverse health effects once ingested.

Enteric pathogens found in untreated rainwater supplies include bacteria, viruses and protozoa. Likely sources of enteric pathogens include:

- faecal material (droppings) deposited by birds, lizards, mice, rats, possums and other warm blooded animals;
- dead animals and insects, either in gutters or in the tank itself.

Microbial quality is the most important factor in determining if water supplies are safe for human consumption.

Microbial quality of drinking water is measured by testing for *Escherichia Coli* (*E. Coli*), or alternatively thermotolerant coliforms (faecal coliforms), as indicators of enteric pathogens (faecal contamination).

There must not be any *E. Coli* bacteria present in a sample of water to be safe for human consumption, as per the *Australian Drinking Water Guidelines 2011*.

Testing

Gympie Regional Council provides a water sampling service for microbiological 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.

If you suspect your rainwater supply is not safe due to microbial contamination and you are experiencing symptoms of gastroenteritis, vomiting, diarrhoea, seek medical help. While rainwater supply may not be the source of the illness, a simple faecal test can be performed to determine the cause of your symptoms. This test may also help identify the pathogenic microorganism responsible e.g. *Cryptosporidium*, *Giardia*. Method of treatment of water will depend on the type of the microorganism responsible. For example, *Giardia* is resistant to chlorination, but can be filtered out of water supply.

All microbiological water samples are required to be collected by council's Environmental Health Services to prevent the risk of any possible contamination. The turnaround time for the results is 3-4 days.

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

Other 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. 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 like 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. Please note activated carbon filters will 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 being 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:

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

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. Please 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.

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

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

- 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.

Receiving drinking water from a water carrier

Before ordering a load of water, please consider the following:

- Check that the water carrier holds a current Food Business Licence with a council. This will ensure that the water delivered is from an approved source (council treated water supply standpipe);

- Clean out any sediment, sludge and algae in your tank as this will be stirred up during filling and may give the water an unpleasant taste and/or odour for 24-48 hours. This is due to the reaction of chlorine (from Council treated water supply) with the organic matter in your tank. Some commercial tank cleaning companies can vacuum out the sludge with minimum water loss.

Water from a licensed water carrier should be clear and have a slight taste and smell of chlorine as it has come from a treated water supply. You can ask for a sample before accepting the load. If the water is not clear and has an unpleasant taste or smell (other than chlorine), do not accept the load.

For further information, refer to receiving water from a water carrier.

Additional information

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

Australian Government Department of Health - [Guidance on use of rainwater tanks](#)

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

Western Australia Department of Health – [Ultraviolet disinfection of drinking water](#)

Contact us

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