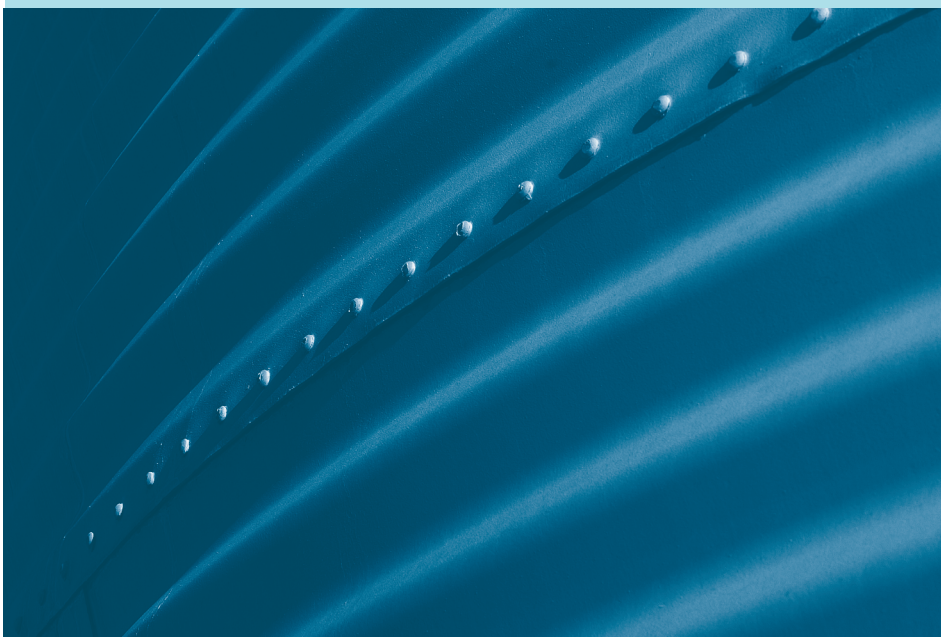


Rainwater Tanks



Water is our most precious natural resource and something that most of us take for granted. We are increasingly becoming aware of the importance of water to our survival and its limited supply, especially in such a dry continent as Australia.

Rainwater tanks can provide a renewable supply of natural, soft, clear and odourless water that can be used for a range of purposes. In some areas it may represent the primary source of household water.

Is the water safe to drink?

Generally yes. A properly maintained rainwater tank can provide good quality drinking water. Providing the rainwater is clear, has little taste or smell and is from a well maintained water catchment system it is probably safe and unlikely to cause any illness for most users.

Rainwater tanks are widely used as a source of drinking water throughout rural Australia. Water used for household purposes for drinking, food preparation or bathing should meet water quality guidelines in order to protect you and your family's health. The water should be free of harmful microorganisms or harmful levels of chemicals. By far the greatest potential risk to your health comes from contamination of water with harmful microorganisms such as bacteria and parasites from bird or animal droppings. Rainwater tanks can also be contaminated from roof or plumbing materials.

The microbiological quality of rainwater collected in domestic tanks will be poorer than that of many public water supplies. Occasionally there are cases of illness from contaminated rainwater. However, providing systems are well maintained the risk of harmful organisms being present is low.

Premises that serve the public or employees and use rainwater for drinking and/or cooking should comply with NSW Health's Private Water Supply Guidelines.

Rainwater tanks in urban areas

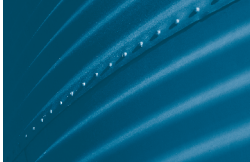
In urban areas the public water supply remains the most reliable source of good quality drinking water for the community. In these areas NSW Health supports the use of rainwater tanks for non-drinking uses, such as toilet flushing, washing clothes or in water heating systems, and outdoors for uses such as garden watering, car washing, filling swimming pools, spas and ornamental ponds, and fire fighting. Use of rainwater conserves the public water supply and helps to reduce stormwater impacts. In urban areas NSW Health recommends that people use the public water supply for drinking and cooking because it is filtered, disinfected and generally fluoridated. The quality of public water supplies is regularly monitored.

People who choose to use rainwater for drinking and cooking should be aware of potential risks associated with microbiological and chemical contamination. Rainwater tanks in urban areas can be contaminated with airborne contaminants from heavy traffic, smelters and heavy industry.

What if I have a weakened immune system?

People with special health needs such as those who have a severely weakened immune system (the

rainwater can be disinfected by bringing to a rolling boil, and allowed to cool before drinking.



immunocompromised); including some people with HIV and AIDS, transplant recipients, dialysis patients and cancer patients; should talk to their doctor about potential risks from drinking rainwater. These people, and the very young or very old, may wish to take extra care by using only boiled, bottled or micro-filtered water and avoiding foods and beverages that may contain rainwater. Please contact your doctor or local Public Health Unit if you require additional information on this issue.

People should be aware of the dangers of scalding and be careful when boiling water.

Fluoride

Rainwater does not contain fluoride. Where rainwater is the major source of water for drinking and cooking, advice about alternative sources of fluoride should be sought from your local dentist, school or community dental service or from the Australian Dental Association.

How can water quality be protected?

The provision of good quality water depends on correct design and installation followed by sensible maintenance of the rainwater tank and catchment area. The collection of rainwater involves “low maintenance not no maintenance”.

It is good practice to flush rainwater taps used for drinking or cooking for 2 to 3 minutes at the start of each day. This is because water that has been standing for a long time can dissolve metals such as copper and lead from the pipework. This “first-flush” of water can be used for washing up, watering plants or other non-drinking uses.

The tank

Tanks are available in a wide range of materials including steel (galvanised and Aquaplate), concrete, fibreglass or plastic. All of these materials can be suitable providing the tanks have been manufactured specifically for the collection of rainwater. It is also important to note that:

- Some PVC pipes may contain lead so if the water is for drinking purposes, only high quality plastic pipe and fittings should be used (‘drinking water’ not ‘stormwater’ grade).
- There have been some reports that water collected from metal roofs can react with steel tanks to cause corrosion.
- Some types of new tanks may have to be washed or flushed before use. The manufacturer should be able to provide advice on whether this may be necessary.

When installed the tank should be covered to prevent light from reaching the water, as it will encourage the growth of algae. Every access point should be sealed unless in use. The inlet and overflow of the tank should incorporate a mesh cover and a strainer to keep out materials such as leaves and to prevent the access of mosquitoes and other insects.

The top of the tank should have a tightly sealed access cover, to stop animals and children entering but to allow access to the tank for cleaning and inspection purposes. Any ground level covers should also be sealed to prevent stormwater entering in-ground tanks.

The catchment

In general, house and shed roofs are used as catchment areas. Rainwater can be collected from most types of roofs, including asbestos-cement roofs, providing they have not been painted with lead-based paints or coated with bitumen-based material.

Roofs coated with acrylic paints may contain dissolved detergents and chemicals that can affect the colour or taste of rainwater. The first few runoffs from these types of roofs may need to be discarded. Rainwater collected from the first few runoffs from new concrete tiled or metal roofs should also be discarded.

As a precaution the use of pesticide-treated timbers and lead flashing should be avoided in roof catchments. Also, if possible, rainwater should not be collected from parts of roofs incorporating flues from wood burners.

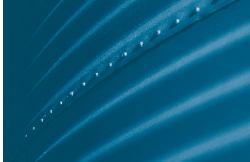
Overflows or discharge pipes from roof mounted appliances such as evaporative air conditioners or hot water systems should not be allowed to discharge onto the roof catchment area.

First flush devices

First flush devices prevent the first portion of roof run-off from entering the tank and will reduce the amounts of dust, bird droppings and leaves etc, that can accumulate on roofs, from being washed into tanks. The use of these devices is recommended.

Alternatively the tank inlet should be disconnected so that the first run-off of rain after a dry spell is not collected.

If your house is oversprayed by aerial chemical spraying, divert the collection pipe from your rainwater tank to prevent any pesticides from entering the tank. Clean the roof or wait until after the next rainfall before reconnecting your drinking water tank to your roof.



If the tank is your only source of water, it can still be desludged regularly by siphoning the sludge off. If the sediment has been stirred up, the water can be

treated chemically with chlorine and/or boiled before consumption. The best arrangement is to have two tanks and clean them out alternately.

Tank maintenance

Proper maintenance of the tank, catchment system, roof, gutters and inlet is essential to ensure a safe supply of water and is best carried out before seasons when heavy rain is expected.

Roof catchments and gutters should be inspected and cleared of leaves and other debris every three or four months. Overhanging branches should also be removed where possible. If overhead wires are too close for safety, contact your local power authority for advice.

All screens should be cleaned regularly. Tanks should not be allowed to become breeding sites for mosquitoes. If mosquitoes are detected in a tank the entry point should be located and closed. For most types of tanks mosquito breeding can be stopped by adding a teaspoon of domestic kerosene, which will eventually evaporate. Power kerosene should not be used as it will taint the water.

Desludging

Tanks should be examined for accumulation of sludge at least every 2-3 years. If sludge is present in the tank it should be removed by siphon or by complete emptying of the tank (desludging).

Do-it-yourself tank cleaning presents a number of risks including working in confined spaces. It is important to be aware of occupational health and safety guidelines.

Tanks with a 'cone scour' base are easy to clean by simply opening the cleaning outlet to allow the water to gush out with the sludge then rinse with a hose. Small, flat-bottomed tanks can be drained, rinsed with a hose and tilted to drain. One method of cleaning big flat-bottomed tanks is to get inside with a bucket, shovel and broom and dig out the sludge. A second person should be present to ensure the safety of the person inside the tank.

Clean a big tank early in the morning or when the area is shaded to avoid heat exhaustion. For light inside the tank, use a battery lantern not a flame or electric extension. If chemicals are being used for repairs inside, a respirator may be necessary.

Professional tank cleaners are available in some areas.

A concrete tank could crack if it dries out. Check with the tank supplier to find out if the type you have can safely remain empty for a few weeks. It might be necessary to put water in the tank to stop it from cracking.

Plastic tanks will need some water or should be tied down to stop them from blowing over in strong winds when they are emptied.

Disinfection

Rainwater can be disinfected by bringing to a rolling boil, and allowed to cool before drinking.

Regular disinfection should not be necessary (unless required on medical advice). However, if you suspect that water in the tank is contaminated, it can be chlorinated by adding powdered swimming pool chlorine (calcium hypochlorite, 65 per cent available chlorine) or liquid chlorine (sodium hypochlorite, 12.5 per cent available chlorine). You should not use stabilised chlorine (chlorine cyanurates).

It takes about 5 milligrams of chlorine per litre to disinfect your tank. This is equivalent to 7 grams of calcium hypochlorite or 40 millilitres of sodium hypochlorite per 1000 litres of water. A level dessert spoon may be used as an approximate measure for 7 grams of powdered calcium hypochlorite. A lot of the chlorine may be used up during disinfection. There should be at least 0.5 milligrams per litre free chlorine, 30 minutes after the chlorine is added – you can use a pool chlorine test kit to measure how much chlorine is in the water. Note that milligrams per litre is the same as parts per million.

You should be able to smell the chlorine faintly an hour or so after treating the water. If you can't, you may need to add a similar amount of chlorine again. Ideally the tank shouldn't be used for at least 24 hours to allow the chlorine taste and smell to dissipate and for harmful microorganisms to be destroyed.

To maintain a safe water supply after the initial dosage, 1 gram of calcium hypochlorite or 4 millilitres of sodium hypochlorite per 1000 litres should be added to the rainwater tank and allowed to stand for a minimum of two hours. The water will be safe to drink provided the chlorine smell is not too strong.

It is important to mix the chlorine in a plastic bucket IN THE OPEN AIR before adding it to the tank. Mix it thoroughly with the tank water. Do not pour water into chlorine, always add chlorine to water.

Other forms of water treatment may also be used, such as disinfection with ultraviolet light (UV) or filtration. Not all filters remove or inactivate harmful microorganisms. If a filter is used for health reasons, then it should meet an appropriate standard (such as AS/NZS 4348 or ANSI/NSF 53). Units that incorporate boiling, distillation or reverse osmosis processes are also satisfactory. An additional disinfection unit may be necessary to inactivate bacteria. It is important to follow the manufacturer's instructions. Filters should be correctly installed; maintained and replaced regularly otherwise they will become ineffective and can allow bacteria to grow that are then released into the filtered water. Please contact your local Public Health Unit for further advice on disinfection and filtration.

Water heating systems that operate between 60 and 70°C will kill harmful bacteria. The temperature should be 50°C or less at outlets used for personal hygiene. The temperature should be 43.5°C or less at outlets used for personal hygiene in childcare centres, schools, nursing homes, or similar facilities for sick, aged or disabled persons. Rainwater may cause corrosion in water heating systems. Suppliers can provide advice on modifying water heating systems to suit rainwater. It is not recommended that water from the hot water tap be used for drinking or cooking.

Choosing a rainwater tank

The size of the tank required to meet household needs will depend on a number of factors including:

- **Rainfall** – the average annual rainfall, the pattern of distribution throughout the year and the variation from year to year
- **Roof Area** – which places an upper limit on the amount of water that can be collected
- **Acceptable Level of Security** – the risk or possibility of the tank running dry. A higher level of security will be required where tanks are the sole source of supply
- **Demand** – which varies enormously from household to household and season to season depending on: number of people in the household; their water use habits; what the rainwater is used for and the number and type of water saving appliances.

Where a tank is to provide an alternative or secondary supply (eg to the public water supply), the size of the

tank is not such a critical issue and often will depend on considering user requirements (garden watering, car washing etc) balanced against cost.

What if I need more water from another source?

Rainwater may be supplemented by water from other sources such as rivers, creeks and dams (surface water) or bores (groundwater). However, water from these sources may require additional treatment, such as filtration and disinfection, to maintain water quality.

If you top up your tank from a water carter you should ensure that you are being supplied with clean (potable) drinking water from a clean tank. Water Carters should comply with the NSW Health Guidelines for Water Carters and be registered with the local Council and NSW Food Authority.

Where can I get more information?

- Your local Public Health Unit can provide information on water quality and health (under "Health Department of NSW" in the Telstra White Pages or at <http://www.health.nsw.gov.au/public-health/phus/phus.html>)
- If you have any specific health concerns you should discuss these with your family doctor.
- More detail about managing and using rainwater tanks can be found in the book 'Guidance on the Use of Rainwater Tanks', published by the Australian Government for enHealth in 2004 (ISBN 0 642 82443 6). Printed copies can be ordered from National Mail and Marketing on (02) 6269 1000. Copies can also be printed from the NSW Health website: <http://www.health.nsw.gov.au/public-health/ehb/water/rainwater.html>
- The NSW Health Guidelines for Water Carters are available at: <http://www.health.nsw.gov.au/public-health/ehb/water/drinkwater.html>
- Many analytical laboratories can advise on chemical, microbiological and algal testing of water. If you wish to have some water tested your local Public Health Unit can help you find an accredited laboratory or look in the Yellow Pages under the heading 'Analysts'.
- Your local council can provide information on any building or planning regulations for rainwater tanks in your area.