



TANK WATER

Ensuring you have a safe clean drinking water supply, if you have tank water, involves more than just connecting your roof gutters to the tanks

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Ensuring you have a safe clean drinking water supply, if you have tank water, involves more than just connecting your roof gutters to the tanks. Careful design and maintenance of the complete system, from the roof catchment through to the supply pipework is essential, to exclude contaminants that can pose a risk to your health.

Despite the serious health risks associated with an unsanitary water supply system, it is very common in tank water areas to see gutters overloaded with decaying debris (1), sludged up tanks, and underground pipework without any flushing points, amongst other shortcomings. Contaminants that can find their way into tank water include dust, vegetation debris, animal and bird droppings, dead animals and insects, chemicals and other pollutants.

If you're installing a new system, or already have tank water supply, take the time to design a system, and install features, that will provide a water supply that isn't a risk to your health. Minimal additional expenditure and maintenance effort can ensure safe contaminant free drinking water.



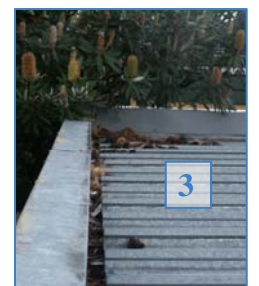
Roof

Most new roofing materials are suitable for drinking water collection, after flushing clean and discarding the first collections of tainted water, but some new and old materials should be avoided. Old lead based paints, bitumen paints and sealants, treated timber, lead flashings and un-coated asbestos are all unsuitable for water collection. If you paint your roof, you should ensure that the coating is suitable, carry out the work in warmer weather so that the paint will cure rapidly, and flush the roof and gutters thoroughly before collection of any water for drinking.



Wood heaters emit toxic chemicals that pollute and corrode roof catchment areas (2), and so ideally water from these areas should not be collected. If you have a wood heater in the vicinity of your roof catchment, it is vital that you always burn dry fuel to minimise combustion by-product fall out, and have an efficient flue installed that is always kept clean. Flues should be double skinned for the full height, to minimise condensation of creosote; and simple metal cowls should be avoided, as they condense and accumulate combustion products, that will fall or blow onto the roof.

Keeping the roof clear of overhanging trees (3) and other vegetation will minimise bird perching areas, and animal access, and therefore the fouling of the roof with droppings. Removing or trimming vegetation will also expose the roof to more sun and drying winds, which will limit damp accumulated debris, that can harbour disease causing organisms and mosquitoes. Television aerials provide ideal perches for birds, and so are best not located over the catchment area; but if there is no alternative, try bird scaring devices, or a network of fishing line over the aerial to make it difficult for them to perch.



Pressure blasting an existing roof will get rid of moss and lichen, chalky or flaking paint and other debris which can pollute collected water. A clean roof is the first vital step in a chain of measures you can take to ensure clean water collection; so clean the roof before taking other steps, and carry out regular maintenance cleaning.

Gutters and rainheads

A reasonable fall on gutters is particularly important when they are collecting drinking water, to eliminate ponding of stagnant water and accumulation of sludge, which will provide a breeding ground for organisms and mosquitoes, and accelerate corrosion. Additional gutter gradient will aid the flushing clear of any debris that accumulates, due to the increased speed of flow, and allow the gutters to dry out quickly. Gutter profile will also have an influence, with flat bottomed profiles being more likely to pond water and collect debris, and half round gutters being the most efficient self cleaning profile. Downpipe 'pops' should be fitted on the underside of the gutter, to eliminate the lip of the fitting and the bead of sealant which retains water and debris when fitted from the top.

Gutter guard screens can be helpful, but need to be of fine fireproof mesh (4) that will easily clear of debris, and not unduly shade the gutter and inhibit drying out. Even if an effective screen is used, the fine sludge that will still accumulate must be able to be easily flushed away. Conventional plastic gutter guard is not particularly suitable, as its usual fitment inside the gutter tends to retain debris, and it is not fireproof.



Screened rainheads can be fitted as a catchment box with the gutter open ending in to each side, instead of having downpipe 'pops'; or as a debris catcher/diverter (5) or diverter (6) in the downpipe. Rainheads are very efficient at catching, or diverting to the ground, leaves and other debris, as open ended gutters and large openings (A) leading to the box allow gutters to clear of debris more readily. Rainheads that shed the leaves onto the ground are preferable to those that retain the debris and have clean water run through it.

Wet and dry downpipe systems

A wet system has downpipes that are connected to a pipework system that runs across under the ground, and then up into the tank. This type of pipework system is often unavoidable, due to the location of the tanks relative to the roof, but can retain sludge and other debris, and may be a breeding ground for organisms and mosquitoes. If a wet system is used, it should have screens at each end, have flushing points in the line and preferably also have a first flush diverter fitted.

A dry system has pipework that runs on a grade all the way down to the tank, and thus does not retain any water. This type of system is preferable, but usually can only be achieved where the tank is very close to the house, and there is a small catchment area needing few downpipes.

First flush diverters

The first flow of water from a roof catchment area can be loaded with pollutants and organisms, which should be diverted away from the storage tank and discarded. A first flush diverter (7) catches this first volume of water in an appropriately sized chamber. When the chamber fills, a floating ball rises to the top and seals the inlet point, which then diverts the incoming rainwater to the storage tank. A small adjustable bleed valve drains the polluted water in the chamber away slowly to a drain, after the fall of rain, which readies the diverter for the next time it rains. First flush diverters can be connected to a downpipe (7), a tank inlet (8) or can be under the ground; and need to divert a volume of water dependent upon the degree of pollutants present. A minimum diversion volume would be 0.5 litres per square metre of roof area to around 2.0 litres per square metre for heavily contaminated catchment areas.



Tanks



Galvanised Tanks



Concrete Tanks

Tanks are available in a variety of different materials, with lightweight non-corrosive tanks being

particularly suitable for drinking water storage, as they won't harbour contaminants or react with the water. A cost effective way to provide solid well drained support for a tank, is to install it on a screeded base of fine stone dust or

very fine gravel, within a levelled and staked frame of treated pine (9) - also see [tank overflow drawing on ABC Tasmania website](#).

Tank inlet and access openings very often allow polluted water, which collects on top of the tank (10), to flow in to the tank at these points. Protect these top openings by fixing a sealed upstand frame around the opening, fitted with a hatch cover to stop pollutant entry ([see tank overflow drawing for detail](#)). Overflows, where they are an open discharge, should



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be protected with a flap valve (11) to stop insect entry, and any vents fitted with screened caps (12). Tanks and covers should also be light proof to minimise algae growth.



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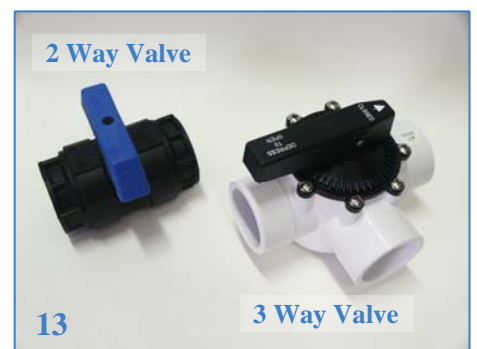
The bottom of the tank should be kept clear of sludge, by periodically siphon vacuuming the bottom with a small swimming pool vacuum head and hose, or emptying the tank to thoroughly clean and flush it out. Tanks can be piped to make the bottom self cleaning, by connecting the overflow to a pipework collector grid on the floor of the tank, which will siphon off debris every time the tank overflows, and not waste clean upper level water. Connection points for pump inlets should not be in the poorly oxygenated and debris laden zone at the bottom of the tank, but ideally a distance up from the bottom to minimise suspended solid pick up, and ensure the best quality water is pumped to the house ([see tank overflow drawing for detail of pump connection alteration and overflow configuration - ABC Tasmania website](#)).

Pumps, pipework and valves



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An isolating valve (13) should be fitted to the tank at the outlet, and it is worthwhile fitting either a disc or screen strainer (14) prior to the pump inlet, to protect shower roses, mixers, taps, toilet cisterns and hotwater cylinders, from fine debris that could interfere with their operation. Barrel unions (15) are worth fitting after the valve and before the house, to allow

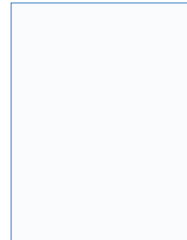
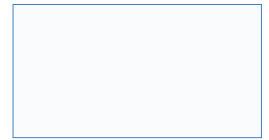


2 Way Valve

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3 Way Valve

disconnection, disassembly and servicing of the pump, strainers and any filter that is fitted. Even though pumps are usually weatherproof (17), they should be located on a well drained slab and fitted with a protective cover to prolong their life (16).



Filters



Filters can give the ultimate clarity, but should not be necessary if water is collected properly in the first place. If you need a filter system, you should first look at the reason for poor water quality and try to rectify that problem, rather than just adding a filter. If you do add a filter it must be cleaned regularly, or it will harbour and incubate organisms. Filter cartridges are available in many grades (18) and can remove coarse silt down to very fine material, with cartridges also available for taste and odour removal.

Maintenance

Ongoing maintenance of a well constructed system is essential for continuing safe water collection. Keep the catchment area clean and trees trimmed, maintain strainers and filters, service pumps, and keep tanks, pipework and first flush devices clean. Chlorination should only be carried out as a last resort in the event of contamination. You may need to supplement fluoride intake, to maintain dental health, if tank water is the only drinking water consumed.

Take steps now to ensure that your tank water supply isn't a risk to your health.

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