

Preventing mosquito breeding

Source: *Guidance on use of rainwater tanks* - enHEALTH.

Mosquitoes and other nuisance insects need to be excluded from rainwater tanks. Water ponding in gutters also needs to be prevented as it can provide breeding sites for mosquitoes and could lead to eggs being washed into tanks (Northern Territory Public Health Regulations 1998 require that gutters should be installed and maintained to prevent ponding).

Unless in use, all access points, excluding the inlet and any overflows, should be kept shut with close fitting lids that will prevent mosquito access. Inlets and overflows should be covered with closely fitting removable insect-proof screens. Queensland (1996) and Northern Territory (1998) Regulations specify the characteristics of the screens as follows:

- Queensland – brass, copper, aluminium or stainless steel gauze not coarser than 1 mm aperture measure
- Northern Territory – brass or bronze wire not coarser than 7 meshes to the centimetre (each way) and of 33 gauge wire.

Mosquito control

By far the preferred approach for managing mosquitoes and other insects is to keep them out of tanks. In addition, rainwater should not be allowed to pool in containers or on surfaces below tank outlets or taps, as this can also provide a breeding site.

Detection of mosquito larvae (wigglers) in rainwater tanks indicates the presence of an opening through which the female mosquito can enter and lay eggs or the entry of eggs laid in ponded water collected in roof gutters. Gaps can occur:

- in mesh used to protect inlets and overflows
- around inspection and access points
- between the roof and main body of the tank
- in the tank itself due to corrosion or physical damage.

If mosquitoes or other insects are found in rainwater tanks, the point of entry should be located and repaired and sealed. As well as preventing further access, this will prevent escape of emerging adults. Gutters should be inspected to ensure they do not contain ponded water, and cleaned if necessary.

There is no ideal treatment to kill mosquito larvae present in rainwater. The two commonly recognised treatments involve adding chemicals (medicinal or liquid paraffin or kerosene) to tanks, which defeats one of the advantages of collecting rainwater. In addition, problems have been reported with both types of treatment.

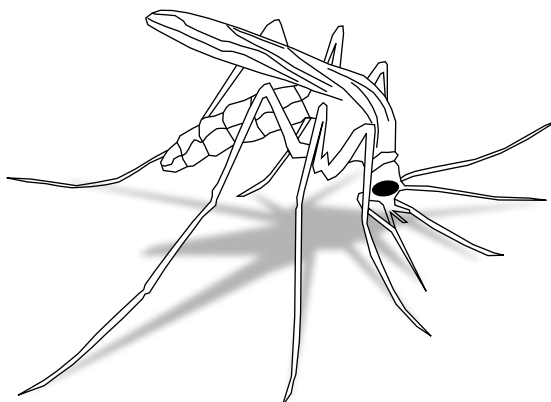
As a last resort, tanks can be treated by adding a small quantity of medicinal or liquid paraffin or domestic kerosene. The recommended dose of kerosene is 5 mL or one teaspoon for a 1 kL tank up to 15 mL or 3 teaspoons for a 10 kL tank. When using paraffin the dose should be doubled.

Note: Commercial or industrial kerosenes, for example, power kerosene for tractors etc., should not be used in rainwater tanks.

Paraffin can be used in all types of tanks, but there have been reports of coagulation after a time and of deposits forming on the sides of tanks.

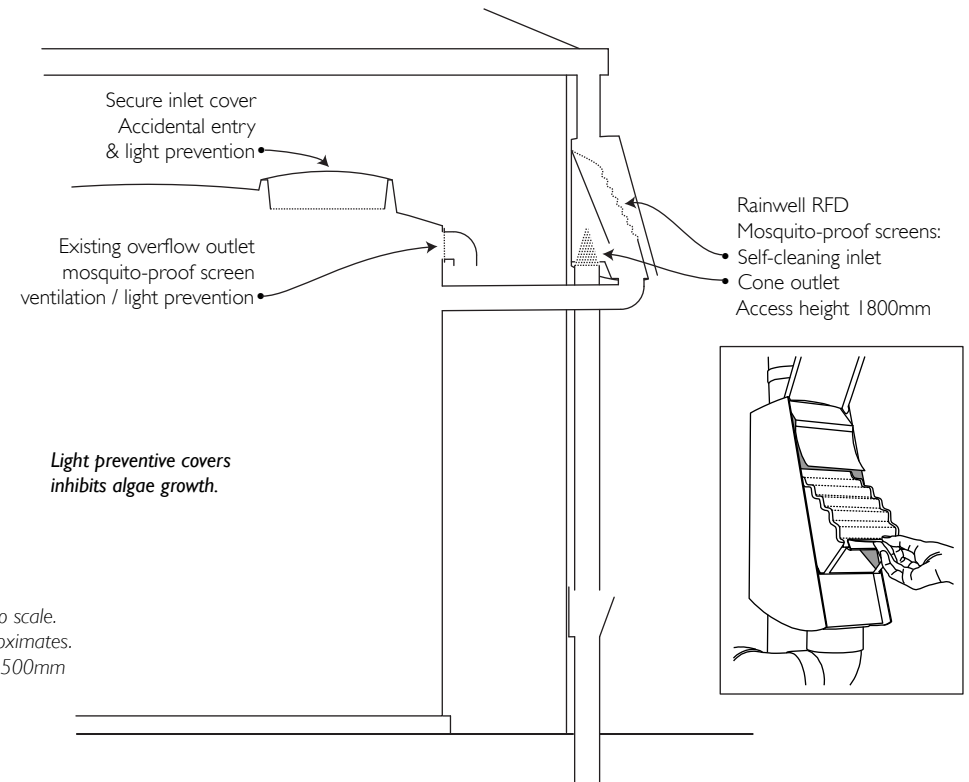
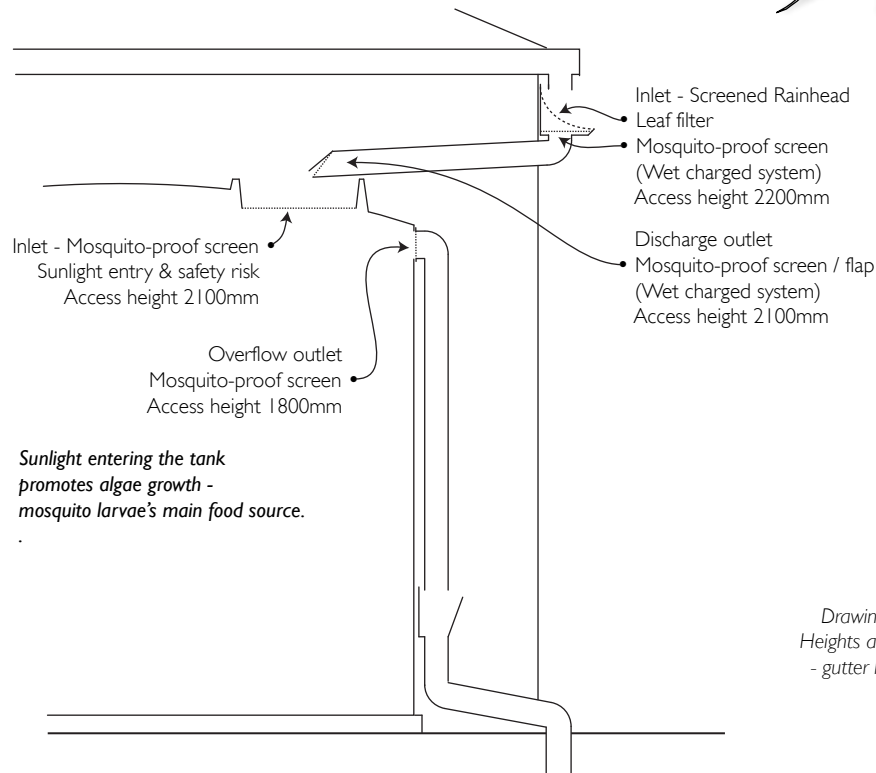
Kerosene is not suitable for use in tanks coated with Aquaplate® and may not be suitable for use in tanks constructed of or lined with plastic. If in doubt, consult the manufacturer of the tank. Used carefully, kerosene will not result in risks to human health, but excess quantities can taint the water and very high doses can be poisonous to humans. Kerosene added to the surface will not mix through the body of rainwater in the tank and it will either evaporate or be washed out of the tank by overflow. Kerosene should not be added to tanks when water levels are low. If excess quantities of kerosene are added to the point that taste is affected, the only solution is to drain and clean the tank.

Internationally, it has been suggested that larvicides, such as temephos, s-methoprene and Bti (*Bacillus thuringiensis*), could be used in rainwater tanks (WHO 1997) but these chemicals are not registered for use in drinking water by the Australian Pesticides and Veterinary Medicines Authority. While permits could be sought, it is unlikely that this approach would receive much support in Australia. In addition the Australian drinking water guidelines advise that pesticides (including insecticides) should not be detectable in drinking water supplies.



Mosquito Prevention System Comparison.

Rainwater tanks systems can be breeding grounds for mosquitoes, and without control & maintenance rainwater tanks can become a serious hazard.



Drawings not to scale.
Heights are approximates.
- gutter height 2500mm

Dry & Wet Charged System

Control: Installation requires mosquito-proof screens on rainwater tank openings, and on both ends of wet-charged pipework. These measures stop mosquitoes from entering to breed and prevent storage developed mosquitoes (eggs/larvae from guttering) from escaping.

Maintenance: Inlet and overflow mosquito-proof screens require cleaning, which can be difficult, time consuming and risk personal safety - barriers that can discourage maintenance which lead them to block; subsequently, causing water loss, property damage and ponding for mosquito breeding sites. Also, removing screens for cleaning can release storage developed mosquitoes and increase the risks of gaps when refitting.

Result: Avoiding maintenance and blockages may see the removal or modification of mosquito-proof screens, which will reduce water quality and accelerate mosquito breeding - turning the rainwater tank into a hazard to our health and environment.

Rainwell RFD System

Control: Whether, above or below ground rainwater tank connection, the Rainwell RFD controls mosquito-proofing with only 2 low-maintenance screens. Light preventive covers over rainwater tank openings will inhibit algae growth - mosquito larvae's main food source.

Maintenance: Readily accessible for inspection at one location and the easy-lift-out filters turns cleaning into a simple task. The inlet filter is self-cleaning but will require occasional cleaning to remove sludge build up. The outlet filter lifts out easily and rarely requires cleaning. A cloth can be placed over the inlet opening to prevent storage developed mosquitoes escaping.

Result: Personal safety risks are minimised and maintenance requirements reduced and simplified - safeguarding mosquito prevention and water quality.