

Plumbing newsflash

Rainwater tanks—mosquito protection and first flush devices

Purpose

To remind local government officers, building certifiers, plumbers, installers and owners of mandatory requirements for rainwater tank safety—including requirements under the Queensland Development Code (QDC) mandatory parts (MP) 4.2 and 4.3—of the importance of mosquito protection and the installation of first flush devices for rainwater tanks.

Legislation

- *Building Act 1975*
- *Building Regulation 2006*
- *QDC MP 4.2 Water Savings targets and MP 4.3 Alternative water sources—commercial buildings*
- *Public Health Regulation 2005*
- *Guidelines for water savings targets and alternative water sources commercial buildings*

Issues

Mosquito protection requirements

QDC MP 4.2 and 4.3 require rainwater tanks to have suitable measures in place to prevent mosquitoes and vermin from entering the tank. Acceptable solutions involve the installation of mosquito-proof screens or flap valves at each of the tank's outlets and a screened downpipe rain head on each downpipe.

Some problems have been identified with the installation of wet charged systems, particularly at the point of entry and overflow of the rainwater tank. At the point of entry to the tank, it is essential for the delivery pipe (which discharges over the tank's perforated inlet tray) to also have a mosquito-proof screen on the end of the delivery pipe as well as the tank's perforated inlet tray. This is required because the in-ground delivery pipes will generally hold water and they can be an ideal breeding ground for mosquitoes.

It has been brought to the department's attention that some installers have been gluing the mosquito-proof screen to the discharge pipe and then gluing the whole fitting to the tank outlet. This prevents rainwater tank owners from accessing mosquito-proof screens installed at the outlet for cleaning purposes. Provision must be made to ensure the tank owner can regularly clean any mosquito-proof screens, therefore glue should not be used to permanently attach the whole fitting to the tank outlet.

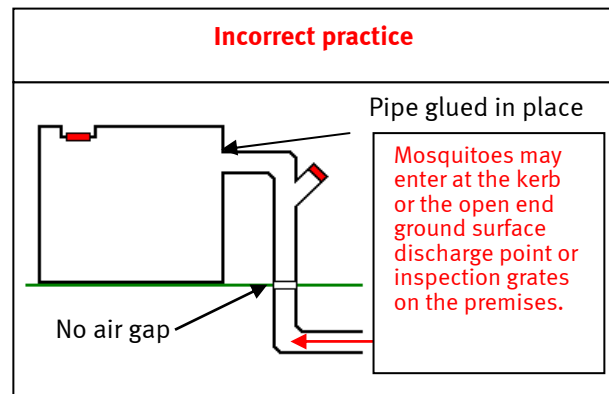
Air gap or non-return valves

MP 4.2 requires a rainwater tank overflow to have either an air gap or non-return valve. The department has received reports that overflow piping is being installed without an air gap and that installers are using a 45 degree upward facing junction then fitting a mosquito-proof screen to the branch of this junction to comply. This practice is incorrect and does not comply with the performance criteria.



This practice does not prevent mosquitoes or other vermin from entering the tank and is not deemed to satisfy (DTS) or performance solution (PS) and should be ceased immediately. Mosquitoes may easily enter the rainwater tank through the overflow drain either at the kerb or the open end ground surface discharge point on the premises.

Drawings in Attachment 1 provide examples of correct and incorrect installation practices for both dry and wet-charged systems.



First flush device requirements

Catchments for rainwater tanks are generally harvested using either a wet charged system or a dry system. QDC MP 4.2 requires a minimum of 20 litres of the first flush of roof catchment to be diverted/discarded when rainwater is connected to showers, taps and hot water services, or where required by a local government in a planning instrument.

While first flush devices for wet charged systems (diverting/discarding the required minimum of 20 litres in the first flush) are being installed immediately prior to discharging water into the rainwater tank, the remaining volume of stored water in the in-ground pipe is entering the rainwater tank and potentially lowering the water quality of the rainwater tank supply.

In a wet charged system, water will more than likely remain in the in-ground pipe between rain events and where a long period of time elapses before a significant further rain event, the water may stagnate to some degree. This water will typically contain some dirt remnants and organic matter washed from the roof catchment. To maintain a high level of water quality, it is important to consider periodically flushing the in-ground pipe, through a flush point and possibly also allow for a location to position a drain point to release any stored water in areas where significant leaf matter is expected to fall on a roof. This is because the stored water only has a small surface area exposed to the air compared to its volume, it is only exposed to a low level of air circulating in the in-ground pipe and at suitable water temperatures bacterial growth may be promoted.

This is different for a rainwater tank however, as a flocculent may be easily added to remove the dirt and debris in the tank and then chlorine added to disinfect the water. This cannot be easily done in a wet charged system, although chlorine may be added to the wet charged pipes.

Even though QDC MP 4.2 specifies a minimum 20 litre volume of water be diverted/discarded, it is suggested that the rainwater tank installer, when determining the first flush volume, also take into account the volume of water that may be stored in the wet charged system. The installer should consider sizing the first flush device with capacity for the required 20 litre first flush volume plus the potential volume of stored water contained in the wet charged system in-ground pipe. This would ensure that all water left sitting in the in-ground pipe after the previous rain event is diverted/discarded during the first flush, will not enter the rainwater tank and the tank water supply is maintained to the highest possible quality.

For dry systems, a first flush device with a minimum volume of 20 litres is installed on the downpipe directing rainwater to the tank, where the water is to be used for connection to showers, wash basins, kitchens, hot water services or where required by a local government in a local planning instrument.



Assessment and approval

Local government and private building certifiers are responsible for ensuring that all building development applications are assessed for compliance against the building assessment provisions.

QDC MP 4.2 and MP 4.3 are building assessment provisions. Therefore local government and private building certifiers are responsible for ensuring that all performance criteria are achieved, which is usually done through compliance with the acceptable solutions. This includes mosquito-proof screens, air gaps or non-return valves and first flush devices.

Maintenance of first flush devices

It is important to ensure that maintenance of first flush devices is undertaken regularly to reduce the risk of mosquitoes breeding and to maintain efficient function. Most first flush devices require very little maintenance, however if leaves block the outlet, the chamber will not empty and when it rains the first flush of water will not be diverted/discarded. Instead first flush water may flow to the rainwater tank and potentially lower the quality of the tank water. Monitoring and maintaining the cleanliness of the first flush device will reduce this potential problem. A blocked first flush device may also become a breeding ground for mosquitoes. If the rainwater tank is located in an area where a lot of leaves are expected to fall on the roof then the first flush device may need to be cleaned several times a year.

It is recommended that the first flush device be checked at least every six months and the following maintenance actions should be undertaken as required:

- unscrew the end cap of the water diverter to allow debris to fall out
- hose or wash the filter screen if required
- clean the slow release control valve.

What are the requirements where a rainwater tank is installed voluntarily?

Where owners elect to install a rainwater tank voluntarily, there are no mandatory requirements under the *Building Act 1975* (BA) to provide adequate mosquito proofing. However, provisions specified in section 2P of the Public Health Regulation 2005 (PHR) require every opening of a rainwater tank to have either mosquito-proof screens or flap valves.

Are there local council requirements where a rainwater tank is installed voluntarily?

The installation of a rainwater tank must also be undertaken in accordance with section 30 of the BA, specifically 30(1)(e), taking into account requirements of any local law, planning scheme provision or local government resolution. This may include specific rules for siting and aesthetics.

Where a home owner is voluntarily installing a rainwater tank, it is recommended that the installation be in accordance with the PHR, the department's guidelines for QDC MP 4.2, MP 4.3 and the HB230 *Rainwater tank installation and design* handbook.

Comprehensive management information for rainwater tank systems is also contained in the enHealth *Guidance on the use of rainwater tanks* handbook. It includes information on potential hazards, preventative measures, monitoring and maintenance.

A copy of QDC MP 4.2 and MP 4.3, associated guidelines and HB 230 are available on the Department of Infrastructure and Planning [website](#).



Where a rainwater tank is installed voluntarily it should include the following:

- mosquito-proof screens or flap valves at each of the tank's outlets
- a screened downpipe rain head on each downpipe
- the overflow outlet should be fitted with an air gap or non return valve
- the first flush device should be installed considering size and location depending on whether it is a wet charged system or a dry system
- maintenance of the first flush device
- pumps to be designed appropriately to ensure minimum and maximum static pressure at outlets is in accordance with AS/NZS 3500.1 2003
- appropriate signage
- general rainwater tank maintenance and cleaning regimes.

Enforcement action

Under section 248 (1)(e) of the BA, the local government may give a notice to the owner of a building, structure or building work if the local government believes the building, structure or building work is filthy, infected with disease or infested with vermin.

Contact details

Building Codes Queensland





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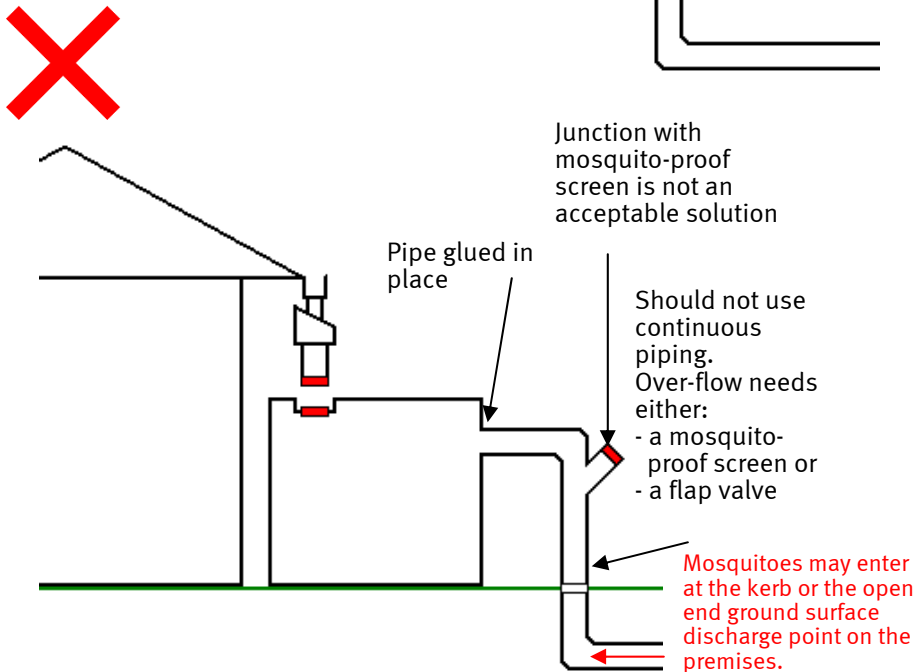
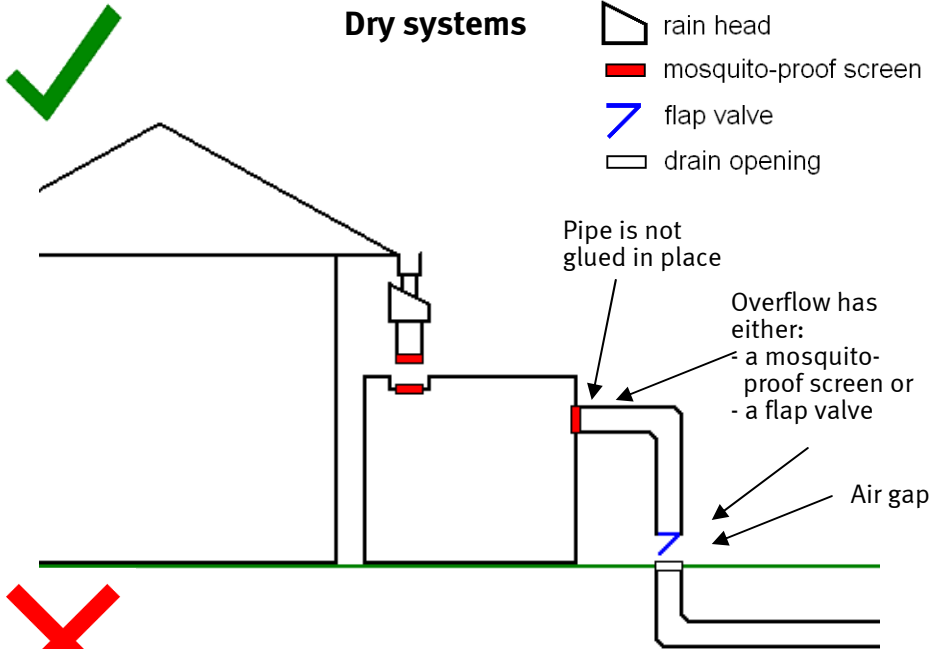
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
Attachment 1

Dry systems

-  rain head
-  mosquito-proof screen
-  flap valve
-  drain opening



Wet charged systems

-  rain head
-  mosquito-proof screen
-  flap valve
-  drain opening

