



Cross Connections and Your Well

Protect your water well from contamination caused by cross connections.

If you use a private water well, it is your responsibility to protect it from contamination and to safeguard the quality of water it produces.

Eliminating cross connections, through proper installation and use of hose bibbs (outdoor water faucets), yard hydrants and other water delivery fixtures will reduce the likelihood of contamination.

What is a cross connection?

A cross-connection is any point in your plumbing system where contaminated water has the potential to come into contact with the potable water being pumped from your well. A cross-connection may be a permanent or temporary connection that could contaminate your water supply if back siphonage occurs.

During normal operations, groundwater is pumped from your well and delivered, under pressure, to the various points of use on your property. If back siphonage occurs it can allow pollutants such as pesticides, fertilizers or pathogens to enter into your water well, through the cross connection at a point of use.

What things should I avoid doing to prevent contamination?

Many cross-connection incidents involve garden hoses connected to outdoor hose bibbs or incorrectly installed, frost-free hydrants.

Using a garden hose and outdoor hose bibb or hydrant for any of the following purposes puts your water supply at risk of contamination:

- Filling a livestock water trough, chemical sprayer or other non-potable container.
- Mixing garden chemicals in a bucket.

- Flushing a clogged septic line or drain.
- Filling a swimming pool or fish pond.
- Using a hose-end spraying device to apply insecticides, pesticides, fertilizers or cleaning products.
- Leaving the end of the hose in a puddle or low-lying area.

Other potential risks

Other possible cross-connections that pose contamination risk are:

- Underground lawn irrigation systems.
- Livestock watering bowls that do not have a check valve or air gap.
- Emergency or back-up water supplies of non-potable water connected to a primary potable water source.
- Connection of multiple water sources with different water qualities.

Without a backflow prevention device between the garden hose and hose bibb or hydrant, the contents within the hose, and anything it is connected to, has the potential to contaminate your water well through back siphonage.

Three things need to happen simultaneously for back siphonage to occur:

- A cross connection exists,
- A check valve leaks or is removed (allowing water to drain back into the well), and
- There is a break in the power supply or a pressure system failure occurs (caused by a pressure switch failure or a power outage).



Never leave a hose-end device attached to the end of a water hose.

How can I protect my well?

Never allow the end of a hose to be submerged in non-potable water. At any point of use (such as a hose bibb, hydrant or other fixture), maintaining an air gap will prevent back siphonage.

An air gap of at least 2.5 cm (1 in) from the top of any storage vessel (that could contain non-potable water) to the end of the fixture or hose will prevent contamination.

Using a backflow prevention device will also prevent back siphonage. Backflow prevention devices are readily available from most hardware or plumbing supply stores.

The type of device required will vary, depending on the nature of the cross-connection.



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Backflow prevention devices

The simplest device is an **atmospheric vacuum breaker** that attaches to the hose bibb of an outside faucet or yard hydrant. It has a check valve to stop back siphonage and an air vent that is normally closed when the water system is in use. To avoid freezing when not in use, the air vent is opened to allow draining of the fixture and hose while still preventing back siphonage of contaminated water.



Figure 1:
Atmospheric vacuum breaker

Dual check valves are plumbed inline before a cross connection, providing a more permanent installation for protection. These are often used to prevent back siphonage from things like automatic sprinkler systems and livestock watering troughs.

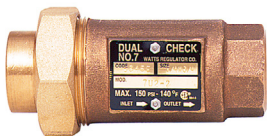


Figure 2 :
Dual check valve

Dual check valves should always be installed at or very near the point of use and never on the pressure tank. Installing it on the pressure tank will maintain pressure in the system even if there is a leak in your water distribution line or the check valve on the pump fails.

Most wells have a single check valve on the pump that prevents water in the water line from draining back down into the well when the pump shuts off during normal operation.

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If that check valve does fail then contaminated water could be draining back into your well.

Also, if you are installing a dual check valve, be sure it is compatible with your pumping system. For example, newer Variable Frequency Drive systems (VFDs) are not compatible with dual check valves designed for standard pumping systems.

Frost-free hydrants

Never install a frost-free yard hydrant on top of a well. When the hydrant is turned off, water in the hydrant will drain directly back into the well, and siphon any contaminated water through existing cross connections. This drainage into the well can also contribute to serious biofouling and corrosion issues.

A hydrant should always be located away from a water well and installed in a manner that allows for proper drainage.

Any configuration done on the well head to prevent frost-free use of a well can pose a contamination risk if it allows back siphonage into the well. Drainage of water lines, for frost-free operation, should never occur inside a well.



Backflow preventers must be installed correctly and should be checked every year to ensure they are operating properly and are protected from freezing.

FOR MORE INFORMATION:

Working Well
workingwell.alberta.ca

Water Wells that Last
<https://open.alberta.ca/publications/9781460143414>

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