

**How can I protect my family  
from cross connections?**

1. Check your water softener or other in-home treatment device to insure that any drain lines have a proper air gap prior to entering the sewer line. The floor drain is considered a sewer line and there should be an air gap if the drain line runs into the floor drain.
2. Check all faucets where a hose might be connected and install a hose bib vacuum breaker to protect these connections.
3. Install a Pressure Vacuum Breaker on your underground sprinklers and have it tested annually when the sprinklers are turned on for the season.
4. If you have a boiler for home heating, make sure the fill line is protected with an approved backflow prevention assembly.
5. If you have old-style sinks or bathtubs, be sure never to fill them so the water level is higher than the fill spout.

***PROTECTING OUR WATER IS  
A JOB FOR EVERYONE***



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**BACKFLOW PREVENTION  
IN THE  
HOUSEHOLD**

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# Protecting Your Family and Your Community



Drinking water is one of our most precious resources and it is the responsibility of everyone to protect this vital commodity. There are many ways that our drinking water become polluted, and the most well known of these are caused by large chemical companies and industries that discard hazardous materials in an unsafe manner. Although these are the most advertised methods of polluting groundwater, the most numerous and avoidable sources of contamination are the result of cross connections.

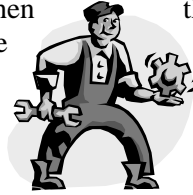
### What are cross connections?

A cross connection occurs whenever there is a physical connection between sources of contamination and the public drinking water supply. Sources of contamination can include hazardous as well as non-hazardous materials. Raw sewage and corrosion control chemicals used in boilers are examples of hazardous materials, while milk, orange juice and other edible substances are examples of non-hazardous materials.

Every house contains several cross connections. Sinks, bathtubs and toilets contain a physical connection between the sewer system and the water system, but current plumbing codes and standards require these devices to be protected by built in air gaps. Some older houses may still have the old washtub sinks and claw footed bathtubs where the faucets are below the overflow level of the fixture, and these are considered an unprotected cross connection. For the purpose of protecting the public water supply, it is the unprotected cross connections that we must address.

### What causes cross connections?

Cross connections occur whenever water is needed for a specific purpose in the home. Unprotected cross connections are usually caused when the equipment for these purposes are improperly installed. Some cross connections are permanent while others are temporary.



Examples of permanent cross connections are the fill line for a boiler used to heat a home, for swamp coolers and for water softeners and other home water treatment systems. These are usually piped right into the water system in the house and often there is no protection included in the installation. The drain line for water softeners are often plumbed directly into the sewer line of the home, which could result in raw sewage being siphoned back into the water pipes. Built in swimming pools, hot tubs, saunas, etc. are also examples of permanent type cross connections. Underground lawn sprinkler systems are a special case in Nebraska, but care should be taken to insure they do not contaminate the water.

The vast majority of temporary cross connections occur when hoses are connected to a faucet. Although the garden hose is the most common example of this type of cross connection, attaching hoses to sink faucets should not be overlooked. A sink sprayer that slips over the faucet is fairly common, and hoses used to fill and empty water beds also constitute a cross connection. Garden hoses are the most common unprotected cross connections. Washing a car, filling a baby pool,

irrigating a garden and spraying pesticides and fertilizer using a garden hose are several situations where a garden hose might end up submerged in a hazardous material. Although many lawn sprinklers are designed to have an air gap built in, soaker hoses and some low-profile sprinklers can end up submerged in water when used. Water toys, such as a slip-and-slide may also be a potential source of contamination.



### Can cross connections affect me?

The affects of a backflow incident resulting from an unprotected cross connection can range from an upset stomach to serious illness or even death. It is suspected that many instances of “the flu that is going around” are in actuality the result of a backflow incident occurring due to a reduced or lost pressure incident in the water system.

Many water systems are starting to use a containment method to protect the system from contamination. This system consists of placing a backflow preventer on the service line prior to any water connection. Thereby keeping any contaminant on the premise from being able to get into the public water system. Although this method protects the public water system, it does not protect the residents of the service from getting a serious illness from a backflow incident on the premises. It is therefore very important for your family that you check your household plumbing to insure that there is no possibility of getting contamination from your house into the water your family drinks.

## **REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER**

These assemblies are used in situations where a high hazard exists, and an air gap cannot be used.



This can occur when water pressure is required beyond the point of protection. In this case, an air gap would not likely work well as water pressure can only

occur beyond the air gap if a pump is installed to place the water back under pressure. These assemblies are not common in homes; although homes that are heated with boilers connected to the public water supply system will likely need one of these installed on the boiler feed line. As with the other assemblies, a reduced pressure principal backflow preventer will have to be tested on an annual basis by a licensed backflow tester to insure it is operating properly.

## **SURVEY YOUR RESIDENCE**

Homeowners should inspect their plumbing to determine if they have any of these devices or assemblies installed. If you do not have hose bibs with built-in protection or hose bib vacuum breakers installed, you can purchase these from your local hardware store or plumber and install them yourself. If you find one of the testable backflow preventers on your property, you should check with your water provider to determine if you need to have it tested on a routine basis, or if there is any regular maintenance that needs to be performed. Preventing backflow is the responsibility of all customers of the water system, and the safe water that results from installing proper protection benefits everyone.

## **A HOMEOWNER'S GUIDE**

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# Common Backflow Preventers and Their Uses



**B**ackflow prevention is necessary to insure that the water we get from our faucets and taps is safe to drink. There are many different ways to prevent backflow from occurring, and this brochure will introduce you to some of these methods, devices and assemblies, and point out where they might be found and why they are there.

### AIR GAP

Air gaps are the most common means of protecting against backflow, and they are also the best protection. An air gap is simply a physical break between the source of the water and the container into which it is running. Air gaps are built in to most sinks found in residences. Kitchen and bathroom sinks, as well as, bathtubs, showers, washing machines and dish washers are designed with an air gap to protect the water supply. Placing a hose on the end of these faucets will render the air gap useless and could allow the contents of the sink to be drawn back into the water supply. Water bed filler kits and old fashioned spray hoses that fit over the faucet are common ways of bypassing an air gap. These should be avoided at all costs.



### HOSE BIB VACUUM BREAKERS

Most houses have hose bibs installed on them so that the owner can use a garden hose to water the lawn and gardens, or use it to wash the car or do other chores that require water. Newer hose bibs are constructed with a built-in vacuum breaker to prevent backflow, but many older homes do not have this type of outside faucet. These older faucets need to be protected with a hose-bib



vacuum breaker which can be screwed onto the hose bib, and the hose is then attached to the vacuum breaker. These vacuum breakers need to be left on the hose bib to prevent back-siphonage occurring in the event of a loss of water pressure. The contents of any container the end of the hose is in could be siphoned back into the water system if this vacuum breaker is removed. No one wants to drink the contents of a baby pool, a hot tub or the bucket of suds used to wash the car.



### PRESSURE VACUUM BREAKERS

Pressure vacuum breakers are the newest testable backflow preventers available. These testable backflow preventers are primarily found on underground sprinkler systems to protect against backsiphonage. There are many different manufacturers of pressure vacuum breakers, and some of them may look a little different than this picture, but they all function pretty much the same way. There is a check valve inside of the assembly that has a spring keeping it closed so no water can pass back through the assembly if the supply pressure drops for any reason. There is also a spring in the top of the assembly that will open an inlet valve which allows air into the system to break the siphon affect and allow the water downstream to flow out of the piping. These devices are very good at preventing backflow on sprinkler systems, but they are not currently required by state law. Many water systems have adopted regulations requiring all underground sprinkler systems to be protected by pressure vacuum breakers, and many of these systems also require them to be tested on a routine basis to insure that they are operating properly. Homeowners should check with their local water supplier



to determine whether these are required to be installed and/or tested. It should be noted that this protection is in the best interest of every homeowner as any contamination pooled around a sprinkler head, such as pesticides, herbicides or animal waste could be siphoned into their water pipes anytime there is a loss of pressure. This loss of pressure could be from the water supplier or due to plumbing repairs within the home itself.

### DUAL CHECK VALVES

Some communities use dual check valves on residential services to help prevent backflow from unprotected cross connections in the customer's plumbing. These devices are not accepted by the state as a part of a cross connection control program due to their limited use, but where they are installed, homeowners must take steps to limit the damage that can be caused by thermal expansion. If you have a device like this in your home, contact your water supplier to determine what steps you may have to take.



### DOUBLE CHECK VALVES

Double check valves are good protection for low hazards, which are hazards that are not harmful to human health. Breweries, vineyards and food services are examples of low hazards. Since most inside uses of water in homes are protected with built-in air gaps, these assemblies are seldom found in residential buildings, but where they are installed, they must be tested annually by a grade 6 licensed tester to insure they are functioning properly.

