Residential Backflow Prevention

Most Frequently Asked Questions

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The combined efforts of cross-connection control (first line of defense) and containment (second line of defense).

Most Frequently Asked Questions

Q I know that cross-connection control is important on industrial and commercial facilities, but is it necessary on residential connections? Is there really a risk?

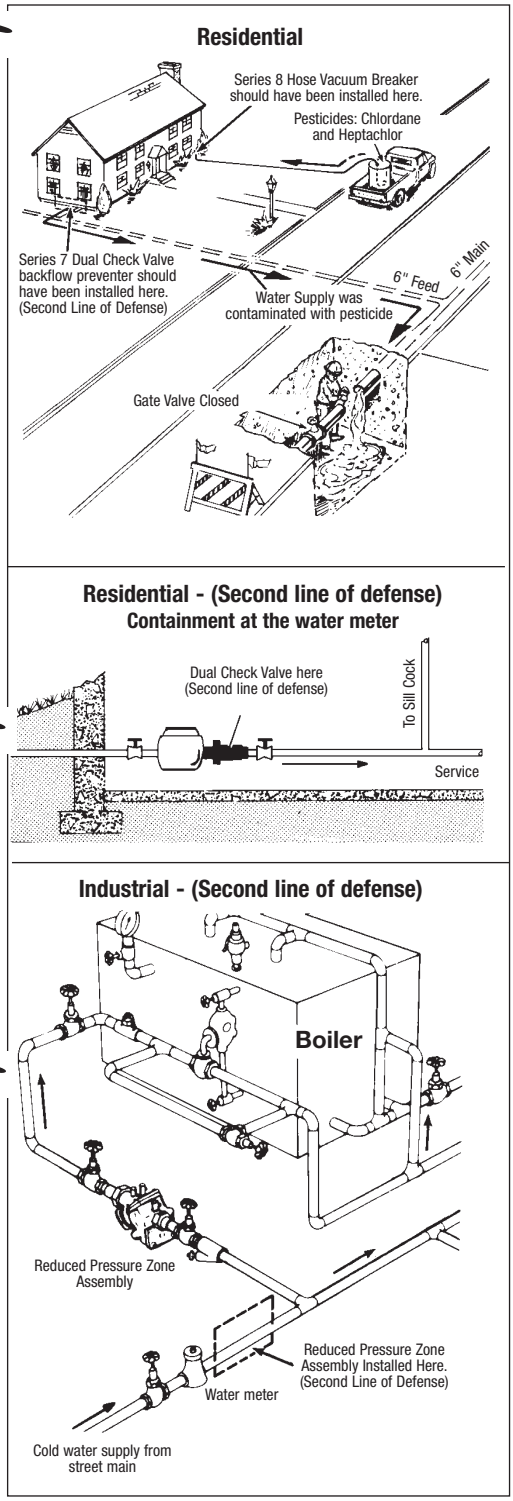
A Cross-connection control is important no matter what type of service is involved. Industrial cross-connection control programs have been used for years. Historically, water purveyors have recognized the potential risk of health hazard industrial connections in their systems and have taken an active roll in protecting the public water supply (primary system) from them. The potential risk from residential connections has been, for the most part, overlooked, even though some of the most serious cases of backflow originated at a residence. Chlordane was siphoned through a hose at a residence in Roanoke, Virginia, contaminating the water supply of an entire neighborhood. The cost to the water purveyor to replace water mains, valves, meters, service lines, water heaters, ice makers, and other plumbing was about $200,000. In addition, lawsuits totalling several million dollars were filed. Since these suits were settled out of court by the water purveyor and the exterminator, no records are available on the actual amount paid, but it was probably considerable.

Q What do you mean by "second line of defense?"

A We call this program of containment at the service connection with a Dual Check Valve backflow preventer the "second line of defense" because it is intended as a backup to the plumbing cross-connection control program which controls backflow at the cross-connection itself. It might be compared to the safety latch on an automobile door where both would have to fail simultaneously before the door could open unintentionally.

Q Is the second line of defense concept limited to residential systems?

A No, the principle must be applied to all systems, although the backup for health hazard facilities would require the use of an assembly that was designed for such installations, such as the Reduced Pressure Zone Assembly backflow preventer. The Dual Check Valve backflow preventer simply was not developed for use in health hazard industrial applications. You wouldn't put a residential deadbolt on the door to the bank vault, would you?



Q If plumbing codes require backflow protection at the cross-connection, why is a second line of defense needed?

A There are several reasons: The first is that plumbing codes, like other rules and regulations, are not always adequately enforced. The second, and by far the most compelling reason, is that the day after the certificate of occupancy is issued, plumbing becomes subject to unauthorized changes. Economic factors motivate homeowners to do-it-yourself plumbing. The bottom line is the cost of a competent plumber versus the savings when the homeowner does it himself. Generally, the homeowner is not only ignorant of the plumbing code requirements, he is totally unaware of the dangers of cross-connection and backflow. Finally, the installation of a Dual Check Valve backflow preventer at the service connection divorces the public water supply from the domestic water supply and establishes jurisdictional authority and responsibility between the public water supply and domestic water system.

Q What types of water system protection are required in a residence?

A Plumbing codes are very specific here. They require backflow protection by cross-connection control and many important safety devices as follows:

1. Air gaps built into sink, tub, and basin faucets
2. Anti-siphon type ballcocks in water closets (toilets)
3. Vacuum breakers on hose bibbs and sill cocks
4. Backflow preventers or vacuum breakers on lawn sprinklers
5. Backflow preventers on supply lines to boilers or other equipment containing non-potable fluids and cross-connected to the potable water system

Because some local authorities modify existing national codes, certain areas require backflow protection on the following as well:

1. Residential swimming pools, hot tubs, and spas
2. Residential solar heating systems
3. Private wells and other auxiliary water supplies

Most homeowners do not know they alone are responsible for the safety of domestic water system. It is up to the water purveyor to inform him.

Q **Is the water purveyor responsible for enforcing the plumbing code?**

A No, but the water purveyor is responsible for protecting the public water supply. That responsibility may include taking secondary measures beyond the plumbing code requirements, such as installing a backflow prevention assembly at residential connections to ensure that contaminated water does not enter the distribution system at one point, only to be served to another consumer down the line. Generally, the water purveyor's responsibility ends at the service-connection to the consumer's water system. However, since the need for this added protection is relatively new (past 15 years) many premises exist that must be retrofit or brought up to today's standard. Therefore, the water purveyor must require the owner to provide proof of compliance with the current plumbing code and install a containment control device at each service or meter. The minimum standard of performance must be met before being tied into the system.

Q **If you are going to install a Dual Check Valve at the service connection, why not go ahead and install a more stringent device, such as the intermediate atmospheric vent backflow preventer or the Reduced Pressure Zone Assembly?**

A If that idea had merit, the water industry would already have adopted it. The fact is, the industry made repeated requests to backflow preventer manufacturers to produce a compact, economical product that could be installed in the meter box as a second line of defense for the community water system. The Dual Check Valve is a direct result of those requests. It is the only practical device for large-scale residential programs and it is designed to be installed with the meter, including in the meter box, for new or retrofit installations. One could equate the use of a Dual Check Valve to the installation of a deadbolt on the front door: it provides better protection than a single lock in the handle, but it certainly doesn't provide the protection of a full-scale electronic security system—nor does it cost as much to install and maintain.

Q **Even so, suppose I decided to use the intermediate atmospheric vent backflow preventer or a Reduced Pressure Zone Assembly at the meter as the second line of defense, could it be installed in the box with the meter?**

A Positively not, because meter boxes are subject to flooding. Each of these items have an air-intake valve that would create a cross-connection the instant it became submerged. You could be creating a more dangerous situation than having no protection at all. The air-intake valves must be installed above ground, and they must be protected from freezing and vandalism. While these products meet specific needs in the industry, they simply aren't practical for meter box installation.

Q **I understand the Dual Check Valve is limited by national standards to one-inch size. Suppose a residence had a service connection larger than one inch—what type of device would be practical?**

A This would be an unusual situation, but a larger size Double Check Valve Assembly could be installed in lieu of the Dual Check Valve.

Q **Speaking of national standards, what standards does the dual check meet?**

A The Dual Check Valve meets the ANSI/ASSE Standard 1024. Generally speaking, most standards address the performance and construction requirements including the quality of materials and workmanship and the quality of the bronze, stainless steel, plastic and rubber parts, and the spring tension, tolerance and tightness.

Q **Do standards ensure reliability?**

A No, all water works equipment requires a maintenance program. The more sophisticated assemblies, such as the Reduced Pressure Zone Assembly, the Double Check Valve Assembly, and the Pressure Vacuum Breakers all have something in common with the Dual Check Valve. We know that after we test a sophisticated assembly, a year will generally go by before we test it again.

During that time, we trust we are protected. This trust is being hedged, however, with the knowledge that the assembly is manufactured to national standards and will, in all probability, prevent anyone from getting hurt. The story is the same with the Dual Check Valve. The most significant difference here is that we know the Dual Check Valve is not installed as a primary device, but as a backup, a sort of insurance policy against a residence not being or not becoming in full compliance with the plumbing code.

Q **You mentioned testing. What are the major utilities doing about testing the Dual Check Valve?**

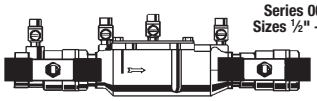
A For the most part, they are using selective spot-testing; but a few are using 100 percent annual testing. All are testing at the time the meter is serviced or upon change of ownership.

Q **How can a water purveyor gain confidence in a Dual Check valve that is designed for selective spot-testing?**

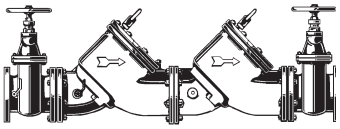
A By experience. All backflow preventers, like other mechanical devices, are depended upon to work for a reasonable period of time after installation. Assuming the water purveyor removes a certain percentage of the assemblies on a selected grid of his distribution system, he will be able to determine if the assemblies are performing as intended and are suitable for extended service, or if his water conditions dictate the need for extensive maintenance or replacement. He can then make adjustments to his spot-testing procedures to ensure even higher reliability.

Double Check Valve Assembly

Series 007
Sizes ½" – 3"

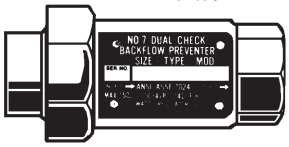


Series 709
Sizes 2½" – 10"



Dual Check Valve Backflow Preventer

No. 7
Sizes ¾" – 1"



Q **Is spot-testing adequate?**

A Selective spot-testing is the mainstay method of quality control used in every industry in the world today, including the potable water supply industry. Clearly, spot-testing is nothing new to the water industry. It is used regularly to test meter accuracy, flow rates, and system pressure. In fact, spot-testing is used to en-sure that the water is within the bacterio-logical and chemical limits established by EPA. The Safe Drinking Water Act re-quires that random samples of water be sent to certified labs. Using this method to test Dual Checks Valves not only makes good economic sense, it can often provide additional valuable information to the water purveyor regarding the overall condition of his distribution system.

Q **If spot-testing is adequate, why are all Reduced Pressure Zone Assemblies tested annually?**

A Unlike the Dual Check Valve, RPZs are intended for use in health hazard installations and are considered the first line of defense. Interestingly, the air gap, purported to be the ultimate in cross-connection control, is assumed to remain in place and function indefinitely, since no periodic reports on inspections are maintained on these installations, even though defeating an air gap by adding an extension is a very simple and commonplace procedure. The selection, maintenance, and testing of every backflow prevention assembly demands the use of sound judgement, based on a reasonable assessment of the risk involved versus the cost of protection.

Q **Regarding risks, is there a potential for liability from backflow into the mains when the source is beyond the jurisdictional authority of the water purveyor?**

A Most definitely. All purveyors connect the public water supply of the utility to the domestic water systems of the consumer. Purveyors must require domestic water systems to comply with state and local plumbing codes (the first line of defense), but experience teaches that this is not always the case. Accordingly, we have a bonafide risk of contamination. The concern over potential liability is intensified by the Insurance Crisis in America and the fact that most utilities can no longer purchase liability insurance. Because we cannot assume that 100 percent of the consumers will comply with the plumbing code, there is no alternative but to take additional measures to protect the public water supply. **That's where the Dual Check Valve comes in, as a second line of defense and establishes jurisdictional authority.** It is economical, dependable, suitable for installation in the meter box, and a lot better than the millions of unprotected services in the country today!

Q **Is there a possibility the utility would be held liable for an incident that occurred in spite of an active second line of defense program?**

A That's highly unlikely. Certainly not if the contamination was contained in the domestic water system and highly unlikely if some of it got into the public water supply. There would be a legal defense for an on-going backup program, even if it failed. There would be no defense for a nonexistent program.

Q **What about thermal expansion? Doesn't the Dual Check Valve create a closed system?**

A A backflow preventer, like any other checking device installed at the service connection, creates a closed domestic water system. The water purveyor has the right and duty to contain all domestic water systems that, in his judgement, represent a threat—or a potential threat—to his public water supply. Prior to closing the domestic water system by installing a Dual Check Valve backflow preventer, however, the purveyor has a responsibility to notify the consumer and the plumbing official, in writing, of his intent to do so. The consumer must then make provisions for any resulting thermal expansion through the installation of a Watts Gov. 80 antisiphon ball cock and relief valve, auxiliary pressure relief valve, or a thermal expansion tank.

Q **Could the water purveyor make his own provision for thermal expansion?**

A No. The control of thermal expansion is plumbing by nature. All domestic water systems that are in compliance with the plumbing code would have provisions built in. It makes more sense for water purveyors to get on with protection of the public water supply and advise the owner or his designated agent to comply with the plumbing code.

Q **Is the residential containment method of water system protection being favorably accepted, and can you elaborate on the actual operations in some of the major cities' programs?**

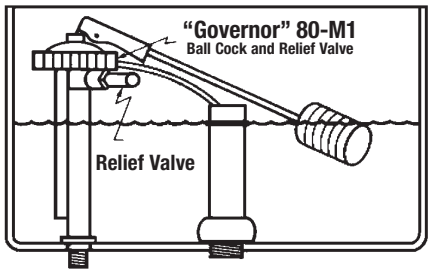
A Yes. "Containment" or the "second line of defense" has been very favorably accepted in the U.S.A. and Canada. Recently, major cities have reported very successful operations of their backflow programs. Since these communities are extending backflow prevention to include residential homes, the water supply is now safe. The actual operations or mechanics of backflow prevention is based on the following:

1. A valve is required on all new residential homes located at the meter
2. Existing homes are retrofit during meter change out programs or at the time of change of ownership
3. All customers are required to provide a certificate of compliance with the plumbing code. Residential homeowners utilize a short, simple, self certification form.

Rather than specifically calling for compliance with cross-connection control, the form is designed to cover water system safety in homes.

Included is a check off for the T&P valves on water heaters, anti-siphon ball cocks, thermal expansion relief devices, etc.

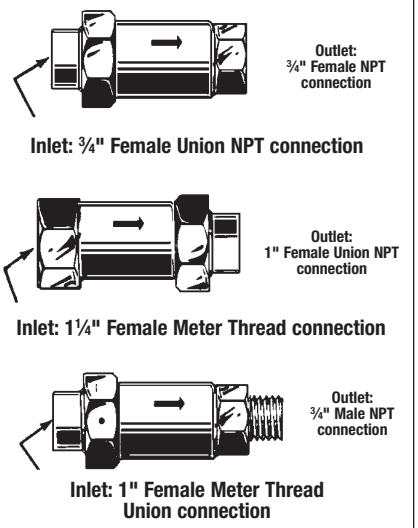
The plumbing code is clear that the owner or his agent is responsible for safety of his plumbing system. It would not be prudent for the public water supplier to require anything less than the minimum legal requirements. No reasonable person would conclude otherwise.



TYPICAL WATER CLOSET

Q **Can the Dual Check Valve be adapted to existing meter installations?**

A Yes, Watts offers models with meter threads, pipe threads, male or female threads, or combinations on one or both ends. Unions are also available on one or both ends.



Q **How much does it cost to establish a "second line of defense" program utilizing Dual Check Valve backflow preventers?**

A The cost, of course, will vary depending on the type of installation. However, compared to the cost of serious backflow incident, a second line of defense program is relatively inexpensive. In addition to the cost of replacement or repair when a public water supply is contaminated, courts may impose judgements in favor of injured parties and the cost can skyrocket —along with bad publicity. How can a utility afford NOT to take extra precautions to protect the public water system, its customers, and its good reputation?

Send for our folder F-BDL that explains the importance of jurisdictional authority, total containment, and several other important subjects that every individual in the water industry should be informed about.

WATTS®

Backflow Prevention Products

ISO 9001-2000 CERTIFIED

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