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Selecting backflow prevention hardware

Anyone who has attended classes on backflow prevention or have read previous articles I've written on the subject should have a good working knowledge on the types of backflow preventers to use in the various scenarios. If back pressure, either a double check valve or a reduced pressure type should be used. If what could backflow might be a high hazard, then only the reduced pressure device should be used. If it's a low hazard situation, then a double check valve can be used. With no back pressure, either a pressure vacuum breaker or an atmospheric vacuum breaker is appropriate, depending whether there is valving downstream or would be under constant pressure. That remains as it has been for as long as I've been in the industry. But there is one concern. It is that just simply taking the lowest bid on your hardware selection might not be the best answer. There are other considerations to take into account.

Of course, size is important. Naturally, it would seem obvious that the hardware should be the same diameter as the piping. But flow must also be considered. Any device that is installed can affect flow. If the piping is of minimal size, installing a backflow preventer could seriously diminish the water supply. This could cause a fire sprinkler system to have insufficient flow. Any hardware that is to be installed in a fire system must first be approved for use in a fire protection system. Secondly, the size and flow must be considered. When designing a new system, the fire protection engineer should have already determined the backflow preventer in his design. It becomes more serious when retrofitting a backflow preventer on an existing system. A backflow preventer could cause a fire system's flow to be diminished less than its needs. Since a larger diameter backflow preventer will usually have less head loss, it is sometimes recommended a larger than line device be installed.

A fire system that has any chemicals (wetting agents, foam, etc.) added must be protected with an RP (reduced principle device). Another scenario requiring an RP is when there is an unapproved water source that could be used but only by fire fighters. Understandably, fire protection engineers dislike an RP because there is a much higher pressure and flow loss. Another potential problem would result if the device was venting with both check valves or the relief valve failing at the time of a fire. Under such circumstances, little water would be delivered to the system. Most water utilities do not meter fire protection systems, but have an annual fee for connecting to the system. In fact, the meters for fire systems must be approved for such use and are notoriously not very accurate. Without a meter, it has been quite simple for water users to use fire system

water for other purposes such as floor wash down, lawn irrigation and other improper usages. The backflow industry responded to this problem by designing both the RP and double check (DC) with a 3/4-inch bypass with a meter. The small line is designed with a lesser obstruction of flow than the main device so that any flow is recorded on the meter. While this will not accurately show how much water has been used, it does reveal that there has been water through the device. Of course, there will be a small amount of legitimate use such as for system testing but if the meter indicates a large usage and there has not been a fire at that location, it's prudent to investigate and correct the water loss issue.

So, as you can see, it is not simple to decide which backflow preventer should be installed on a fire sprinkler system.

Another consideration is whether the facility can be without water for a short time. Many water customers require 24/7 water. Hospitals and industries that work day and night and require water for their production cannot have their water service off for even a short time while their backflow preventer is being serviced. Some may state that it could be overhauled during the time of their annual general plant upkeep when production is interrupted. Unfortunately, like any other mechanical device, a backflow preventer may not wait for a plant shut down. If an RP suddenly starts to vent, there may be little or no water service to the facility. To prevent such interruptions, parallel devices should be installed so one can be shut down to correct whatever has caused it have failed while the other gives continued service.

Obviously, installing a backflow preventer isn't as easy as it first appears.

I'll not bore you with the redundant high hazard, low hazard rules. But there are some other considerations you must take into account. All equipment wears out and must be repaired. Purchasing the least costly device can become a serious headache later.

The kit for a 10-inch RP with which I am familiar lists at $1,600. That's not an item you'd want to carry in inventory on the shelf for a couple years, waiting for a customer's device to fail.

Questions that need to be asked of a supplier should include whether they keep all repair kits in house or would they order them as needed from the manufacturer. If that's the case, then my strongest advice is to fin another outlet. As a utility, a tester/repair technician or owner of a backflow preventer,

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you should not have to keep a large amount of repair inventory. A method of reducing the amount of supplies you would need to keep on the shelf is to find a supplier you are comfortable with that stocks repair kits; then stay with that supplier. Repair kits for large devices are somewhat expensive. The kit for a 10-inch RP with which I am familiar lists at $1,600. That's not an item you'd want to carry in inventory on the shelf for a couple years, waiting for a customer's device to fail.

Another consideration is to ask what is the ease of repair. Most devices are not as bad as they were a few years ago but some are still quite a challenge. The manufacturers tries telling us that they went to top entry to make them easier to service. Any of you who work on these devices sure understand that is not necessarily the case, especially in for the small RPs and DCs. I don't have very large hands and I have trouble working the checks out or back in. It's another case to "look before you leap".

Don't burden users with unnecessary hardware

The worst situation I can think of is requiring a backflow preventer when one is not needed. Backflow preventers are installed when there could be something harmful drawn by vacuum or reverse pressure into the potable water system. Requiring a backflow preventer on a home or other facility with good internal protection is an unnecessary expense that should be avoided. This would be a continuing expense to the owner because a backflow preventer must be tested at least annually. Simply installing hose bibb vacuum breakers on all outlets threaded to receive a garden hose can protect most private homes. Another consideration is making certain water closets have an appropriate fill valve and any lawn irrigation system is properly protected. When you are certain all that this has been accomplished, there is no need for a service line device.

To be certain your selection will perform as it should, check to be sure it has been tested in an approved laboratory. By far, the most rigid testing is done at the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research. (USCFCCCHR). Other testing laboratories include the Uniform Plumbing Code (UPC) and American Society of Sanitary Engineering (ASSE). Be certain your selection appears on one of these approval lists. If not, and a backflow did occur, you could be held liable because an unapproved backflow preventer was installed and someone became injured or some product were destroyed.

As you can see, price might be one part in deciding which manufacturer to choose, but there are other important considerations before selecting backflow hardware. Save yourself headaches by doing some research. I repeat, "Look before you leap".

I hope you will take advantage of the training sessions offered by Kansas Rural Water Association. Trainer Terry Randles has a number of devices of various manufacturers for you to actually disassemble and reassemble that will show you which devices to avoid.