Grainger Consulting, Inc.

BACKFLOW PREVENTERS, CHAPTER 2, INSTALLATION

The previous column discussed the selection of the backflow preventer assembly (BPA). The selection was limited to the group of BPA based upon a double check valve assembly which includes reduced pressure BPA. No mention was made of detector check assemblies. More due to a lack of space than anything else, so this column will take care of that shortcoming.

Detector check BPA's are simply a BPA with a parallel set of smaller diameter check valves and a meter. The design problem associated with the use of this type of BPA is the higher pressure loss across the primary BPA which is caused by the heavier springs holding the primary BPA check valves closed to force lower flows through the meter side of the assembly. High flows, such as those associated with an automatic fire sprinkler system would operate the primary BPA but at a cost of significantly higher pressure loss.

The negative side of specifying a detector check is not limited to extreme pressure losses. If you read the previous column on BPA selection you may recall the analogy between BPA and gold mines. The column questioned the need for BPA's in many instances for any useful purpose other than generation wealth for the manufacturers, distributors, qualifying agencies and installers of these devices. In the case of detector checks, we can add another gold miner to the list of offending parties, the water purveyors. The installation of a meter that has been mandated by the self serving water purveyor, will give them a basis on which to charge a monthly fee for the meter in addition to any flow that may pass through the device. Not to say that there are no conditions under which the requirement for a detector check is actually justified, I just haven't ever seen one. There are conditions when the design engineer may want to have low flows measured for purposes peculiar to the owner or operator of certain types of systems, in other words, a valid justification for the meter.

Getting back to installation; the best place for a BPA is in a warm and secure location. We all know that. The problem is in how it is interpreted. That is where the interesting part begins with installation. Often times, the local authority having jurisdiction specifies a location, such as at the property line. Doesn't everyone want a two legged iron monster in front of their business? The water purveyors that insist upon this location must get a real charge out of seeing all of those targets that they have caused to be installed, all lined up along the street. BPAs at the curb make great targets for automobiles, trucks, kids with nothing else to do and other miscreants. Yes, it is true that if the BPA is put some place safe such as inside the building or at least up next to the building, that some unscrupulous

owner may make a cross connection someplace upstream of the BPA but what costs are we paying for this perceived level of protection? No one tracks the repair and maintenance costs associated with damage by any of "targeting" sources with the possible exception of some of the gold miners. I don't suppose that they would be interested in putting a stop to the flow, of gold that is. Perhaps, in this terrorist sensitive political climate that we live in, the easy access to the water supply that these devices present should be considered. What better and easier place to inject a contaminant. The BPA has all of those handy small diameter brass fittings and ball valves that one may attach a simple injection system to and probably not even be noticed in the middle of the day. Ten years ago, attempting to get purveyors to listen to this simple logic did not work. Times have changed; I wonder if the water purveyors have? If you are working in a jurisdiction that insists upon curbside location, write them a letter alerting them to the negative aspects of their requirement. Try putting the monkey on their back in case of a problem. Multiple letters from different sources may eventually have an impact..

Many locations have freezing problems associated with the placement of BPA outside. Don't worry; there is a small industry that has developed around this very problem. There are all manner of insulated dog houses available. Some boxes come with heaters for the real cold locations. The problems with using these boxes may not be immediately obvious. Some are just boxes and very little thought has been put into the functional nature of the design. Be sure to specify a box that is designed with a BPA in mind. The OS&Y valve stems do not need to be inside the box but there does need to be a hole for the stem in the roof. The area around the OS&Y valves needs to be sufficiently accessible that they may be operated. The side of the BPA with the test ports must be accessible for the tester. If you provide a heater make certain that there is an alarm to alert the building owner if the heater fails. Don't power the alarm from the same source as the heater otherwise when the circuit breaker fails, there will be no alarm. The best solution is to put the assembly inside and forget about all this monkey business.

Having selected a location outside and determined if a box, steel cage, heater and protective bollards are necessary, the next step is to consider the actual pipe installation. When dealing with large diameter pipe, thrust blocks will be needed at the elbows below grade, unless you use flanged pipe. Concrete blocks may be difficult if the pipe trench is continuous through the assembly position because there will not be enough natural material left for the thrust block. Perhaps the best and simplest solution is to use a small diameter pipe or heavy angle iron attached to each back to back elbow up and securely fastened to the opposing elbows. Above grade the most common problem is support for the horizontal pipe and BPA. Chunks of concrete block laid on the ground don't work well. A minimum of 4" thick concrete pad the length of the assembly, less the elbows on each end is a suitable foundation for the pipe supports that are necessary on the 4" and

larger devices. Be sure that the pipe supports are anchored to the concrete and preferably have saddles and securing straps over the top of the assembly. Failure to provide a solid foundation will help to insure that the device moves out of plumb placing stress on the fittings and making the BPA look even worse than it normally does.

Not all BPA's are outdoors, thank goodness. The support issues are the same as for those outside. The security problem can be easily taken care of. There will be drainage issues that were not of such great concern outside. When a BPA is tested by a certified tester, there will be some minor leakage, unless it is necessary to disassembly some portion of the assembly to replace parts. The biggest problem with leakage, however, will be from the relief valve of a reduced pressure BPA. It is normal for the relief valve to vent some water when pressure surges pass through the system. It is also possible for a BPA to vent much larger quantities in cases where check valve seals fail or there is a negative pressure condition on the supply side of the BPA. Floor drains will not handle such an event for assemblies larger than about 2".

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