Weathering the Winter

Protecting your irrigation system from freeze breaks will help you avoid a "Spring surprise."

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It's a beautiful spring day, nearly 50 degrees and a wonderful break from the long winter of plowing snow, drinking hot chocolate and waiting for the first glimmer of warm weather.

Your first indications of winter's final passing mark the time for system start-up for the large irrigation systems across your grounds, campus or park. You begin by slowly opening the gate valve at the point of connection just to fill the lines. After a few seconds, you hear the rush of water continuing. Not far from where you are standing, you notice a flood of water collecting.

There is a break! Even though you blew the system out with compressed air last fall, there is a break. You shut the gate valve off and check the water meter to see if there is any movement...there is.

After getting a shovel to uncover the damage, your first look at the pipe tells the story. Long, spiraling, lengthwise cracks reveal a classic freeze break.

As any good grounds-care professional knows, proper winterization of a large irrigation system is essential to system maintenance. To avoid freeze damage, a system must be less than half-full of water when the cold weather hits. Yet in cases like the one described above, freeze problems can strike even when you follow standard procedure. Protecting your irrigation systems from the ravages of harsh winters is a matter of following good procedures and using the right equipment. Here are a few tips that may save you time and money.

Volume, Not Pressure

Follow appropriate winterization guidelines. The key to a successful system blowout is not high pressure but a large volume of air. In a blowout, what's important is not the speed of the air, but having enough air to fill the system and push water out through the sprinkler heads. It is imperative with any medium or large system to use a compressor that can produce 100 to 150 cubic feet per minute (cfm) through the system components.

The temptation in winterization is to boost the pressure to get a better blowout. You might think, "If 150 cfm is good for blowout, isn't 100 pounds per square inch (psi) just as good?" Not at all! Valves and sprinkler heads are designed to run at water pressures between 75 and 100 psi. Air need only be sent through the system at 50 psi as long as you have enough volume.

In fact, using a high psi could cause significant system damage. When compressed air is run through a sprinkler system at 100 psi or higher, many components exceed their design tolerances. Excessive wear or failure is usually the result. The faster everything works, the more friction is produced. You risk generating enough heat to melt plastic parts. Gear drives in the sprinkler heads and plastic fittings and pipe near the point at which the compressor is attached to the piping system are especially susceptible to heat damage. To avoid this problem, be sure that your compressor has a pressure regulator set at 50 psi or slightly less.

Monitor Your Valves

Valves react differently when operated with air than they do with water in them. Air trapped in the upper part of the diaphragm sometimes makes valves shut down a bit, not open at all or refuse to close at the end of a cycle. Performing an external bleed may be time-consuming because it involves manually opening a valve to the atmosphere, but it is the only way to guarantee that valves will be open all the way.

By directing the flow of air and water through the valve bonnet into the atmosphere, you bypass the pressure drop through the metering system that you would get with an internal bleed and you completely empty the top of the diaphragm. If you suspect that a valve is shutting down partially, it's a good idea to do an external bleed.

Next, if you have a regulating valve set to normal desired outlet pressure, it could affect blowout if the normal pressure is less than 50 psi. In this case, the valve could shut down during blowout, causing you to get less than desired air pressure. To solve this problem, set the regulating valve at maximum pressure. This step ensures that the desired amount of air was sent through the system. However, it requires that you reset the regulating valve after completing the blowout. A simpler solution might be bypassing the regulating valve altogether by opening an external bleed.

It's never a bad idea to run air through your system twice at each winterization project. The extra time will be well spent if it gets rid of excess water that could settle in your system and cause costly freeze damage.

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Low Head Puddling

Heads situated in low spots that will be at the bottom of a puddle when it rains need special attention. What often happens is that, on a warm winter day, snow melts and water collects around a sprinkler head at a low spot. The water seeps through the sprinkler head into the pipe and fills it more than half full. The temperature drops below freezing for 10 days, and the pipe freezes and breaks. Avoid this problem by installing check valves designed to prevent low-head drainage in the base of the sprinklers. This device will seal up the opening at the base of the sprinkler and prevent water from seeping through the head into the piping system. You should do this when the system is first installed, or before winterizing the first year after installation.

The Right Valve For The Job

One of the best ways to protect your large irrigation system from freeze damage is to use the appropriate valves at the primary system shut-off location. A likely cause of pipe cracks like the one described at the start of this article would be an inexpensive gate valve at the point of connection. When this valve fails, water will leak back into the system after you've completed a blowout. The water will freeze and create a long, spiraling crack in your pipe.

A better valve for a system with up to a 2-inch-diameter service would be a ball valve with a Teflon seat. This type of valve provides excellent protection against backflow at the point of connection. In a system where pipe diameter is greater than 2 inches, a butterfly valve with a Teflon seat will give reliable closure. Even though these components are expensive, the repairs they prevent would far exceed the cost of using these materials. Keep in mind that spending a little more on one key valve can mean the difference between a smooth start-up in the springtime and time-intensive, costly repairs.

As we all know, a smooth start-up is the goal of any grounds-management professional. Taking the time to perform the steps described here can increase the chances that your valves will survive the winter. And you can spend those first warm spring days letting winter memories fade rather than fixing winter's damage.

(Editor's Note: Dirk Lenie is Director of Sales and Marketing for Toro Residential and Commercial Irrigation Products (Riverside, Calif.).