Avoiding Inefficiency & Liability

Backflow prevention & pressure regulation help safeguard buildings from disaster

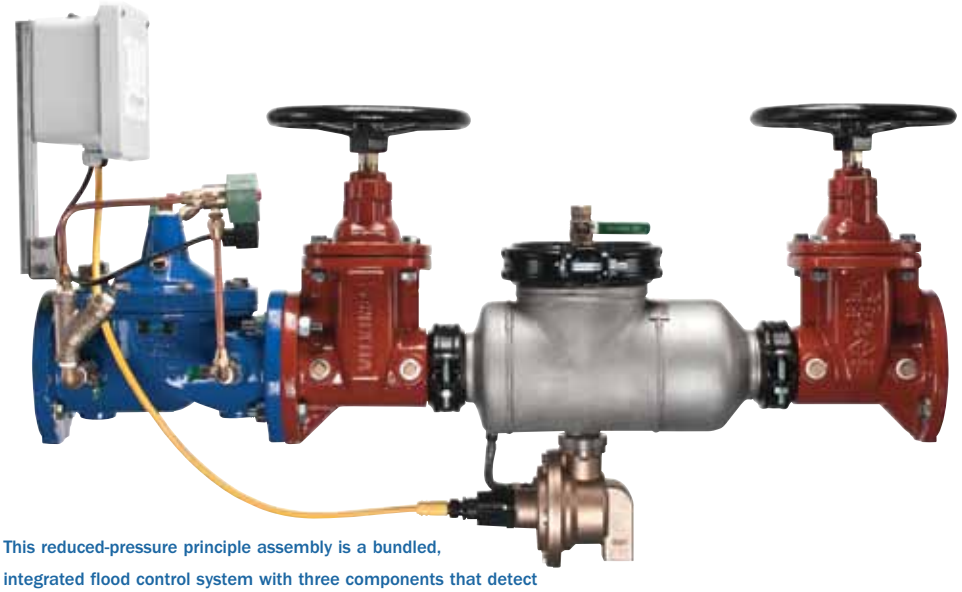
BY EZRA PHILLIPS

Backflow prevention is the unglamorous side of commercial water management—it guards against problems, and is only noticed if something goes wrong. Recent innovations in backflow prevention system design, however, have attracted attention for their improved performance, protection against liability, ease of installation and advantageous lifecycle costs.

At the heart of a properly designed water system for a building are sanitation and efficiency. Whether new construction or retrofit, these values are best achieved through a whole-building approach.

A building's plumbing system strives to maintain a healthy stasis for water pressure. The system is subject to numerous events that affect pressure—some routine, others unpredictable, such as line distribution breaks or high water withdrawal rates. These events can result in back-siphonage that places potable water sanitation at risk.

In addition, irregular pressure can overtax a system's integrity. One of the leading causes of water leaks is high pressure that exceeds the upper range for which the system was designed. On average, water leakage accounts for more than 6% of a facility's water usage. A well-designed system can accommodate both upstream and downstream changes in pressure, including predictable growth/expansion for a commercial building or campus (or the number of end users of a public water system feeding into a building).



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This reduced-pressure principle assembly is a bundled, integrated flood control system with three components that detect and shut down discharging backflow preventers installed in mechanical rooms or other indoor spaces.

Automatic Control Valves

Pressure regulation has grown more sophisticated in recent years. In large-diameter applications, basic direct-acting, pressure-reducing valves have transitioned to pilot-operated automatic control valves (ACVs). These encompass multiple end connection options, pressure ratings, ANSI/AWWA standards, functionalities, and a wide range of applications and uses, including commercial, education, healthcare, industrial and more.

ACVs available on the market include the following types and features:

- Solenoid shutoff;
- Surge protection;
- Solenoid control;
- Non-modulating valve;
- Fire pump pressure relief valve;
- System and pump protection check valve;
- Pressure reducing with low-flow bypass;
- Pressure reducing with pressure sustaining;
- Excess pressure shutoff valve;
- Pressure relief and pressure sustaining;
- Fire protection pressure reducing valve; and
- Fire protection pump suction control.

Manufacturers are reacting to a multitude of end user requirements for water efficiency, while still providing the performance and reliability of the core pressure-reducing valve.

Backflow Prevention

One new type of backflow preventer is ideal for existing low-pressure systems and is easy to install in small spaces. Made of large-diameter stainless steel, it is lightweight and corrosion resistant. It offers a machined check positioning sleeve, eliminating weld-seam leaks; checks that are retained securely, providing stable pressure with faster test results; a flow clean sensing passage to eliminate debris buildup in the sensing line; and a short lay length that allows for installation into smaller spaces. It is available in four functional categories: double check assembly, reduced-pressure assembly, double check detector assembly and reduced-pressure detector assembly.

Backflow preventers can be installed inside or outside of buildings. For interior spaces, such as mechanical rooms, they should be equipped with a bundled, integrated flood control system to protect against flood risk and liability. Flood from a code-mandated reduced-pressure device installed indoors, even when working properly, can result in millions of dollars in cleanup and downtime.

Components should include a reduced-pressure principle assembly with an integral relief valve monitor with a switch that senses a discharge; an electronic solenoid timer that processes any signal from flood-sensing equipment against a settable time function (to eliminate nuisance trips) and, in the case of a fault, sends a signal to a solenoid valve and/or alarm device; and a solenoid-actuated ACV

that shuts off water throughout the system. This new type of backflow preventer typically is shipped fully assembled for turnkey installation in retrofits and other projects.

Avoiding Liability

Proper backflow prevention is also liability prevention. An 8-in. backflow preventer at 100 psi is capable of discharging 600 gal per minute. A mechanical room's floor drainage system does not stand a chance. There have been catastrophic incidents across the country that made headlines. In the 1990s, one hospital's mechanical room was filled with water to a height of 8 ft, resulting in extensive equipment failures and patient evacuations. Cleanup and other costs associated with the disaster exceeded $2 million. Seven years later, another hospital experienced a similar problem. Basement rooms flooded, telephone and computer systems failed, and patients were forced to evacuate.

A review of recent case law demonstrates that it is not enough for a building to be in compliance with local codes. If a building owner has knowledge of industry best practices that exceed local codes, that owner can still be held liable for problems. It is important for a water system to be in compliance with industry standards and for building owners to keep up-to-date records of installation, testing, proper maintenance and plumbing audits (including self-audits). Permits issued for new construction or retrofit work can trigger a system inspection from local authorities. Liability extends beyond problems of pressure and can include reclaimed water systems if any cross-connection points result in contamination of potable water.

Freeze Protection

For backflow preventers installed outdoors, a freeze prevention device is essential in areas where occasional (and unexpected) freeze-thaw cycles occur, yet winterization is not common. Freeze protection devices monitor the water temperature within the valve. When the temperature-regulating thermostat senses that water is nearing the freezing point (35°F/1.6°C), the valve opens, allowing warmer supply water to flow into the system. As the system reaches 40°F/4.4°C, the valve closes.

An advantage of the freeze prevention device is its compact design, which makes it easy to install on new and existing installations on virtually any brand of backflow preventer without the need to shut down or drain the system. Its bronze body is corrosion-resistant and requires no periodic maintenance. It is suited for double check and reduced-pressure assemblies, vacuum breakers and bypass detector assemblies on large backflow products. It also can be used to protect other mechanical equipment, including any smaller-diameter commercial or residential outdoor plumbing system to prevent pipe, pressure-reducing valves, shutoff valves or fixtures from freezing.

The products and systems described above also feature the benefits of simplified installation, reducing costs of labor and employee downtime. Manufacturers can provide advice as to which products are best suited for any building project's needs—with water efficiency, lifecycle value and risk management as top priorities. **CW**

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