
Facility Domestic Water Backflow Preventer Annual Testing Prep

1.0 Maintenance Objective & Frequency

The objective of this procedure is to prepare the facility's domestic water backflow preventer for its annual certification test. This involves isolating the device, cleaning internal strainers, exercising all shut-off and test valves, and ensuring the assembly is free of debris and mechanical binding. Proper preparation ensures the certified tester can perform accurate pressure differential tests without delays or false failures, maintaining compliance with local cross-connection control bylaws and protecting the potable water supply.

This task is performed annually, typically 1-2 weeks before the scheduled certification test date, or immediately following any repair or replacement of the backflow preventer assembly.

2.0 Lockout/Tagout (LOTO) & Safety

- **Hydraulic Isolation:** Close the upstream (inlet) shut-off valve completely. Close the downstream (outlet) shut-off valve completely. Verify zero flow by opening a downstream faucet briefly until flow stops.
- **Pressure Relief:** Open all test cocks (test ports) on the backflow preventer body to vent any trapped pressure. Use a small bucket or hose to direct water to a drain. Wear safety glasses and rubber gloves as water may be hot or contain debris.
- **Personal Protective Equipment (PPE):** Safety glasses, rubber gloves, rubber boots, and a high-visibility vest if working in a mechanical room or near traffic. Have absorbent pads ready for minor spills.
- **Confined Space Awareness:** If the backflow preventer is installed in a pit or vault, perform atmospheric testing for oxygen deficiency and toxic gases before entry. Use a retrieval harness and tripod if required by local regulations.

3.0 Required Tools, Parts & Lubricants

- Adjustable wrench (10-inch or 12-inch) for valve handles and test cock caps
- Flathead and Phillips screwdrivers (medium size) for test cock cap screws
- Pipe wrench (14-inch) for stubborn union nuts or valve bonnets
- Bucket (5-gallon) and short hose to direct water from test cocks to drain
- Clean rags and a stiff nylon brush for strainer cleaning
- Replacement O-rings for test cock caps (size per manufacturer, typically #010 or #012 Buna-N)
- Silicone-based plumber's grease (food-grade if potable water contact is possible)
- Spray bottle with diluted chlorine solution (50 ppm) for sanitizing test cock threads
- Torque wrench (0-60 in-lb) for test cock cap reinstallation
- Manufacturer's maintenance manual for specific torque values and strainer location

4.0 Step-by-Step Maintenance Procedure

1. Verify the backflow preventer model and size (e.g., Watts 909, Febco 765, Zurn Wilkins 375) and locate the manufacturer's maintenance manual. Confirm the device is a Reduced Pressure Zone (RPZ) or Double Check Valve Assembly (DCVA) as preparation steps differ slightly.
2. Perform LOTO: Close the upstream (inlet) shut-off valve fully by turning the handle clockwise until snug. Do not overtighten. Then close the downstream (outlet) shut-off valve fully. Tag both valves with a 'Do Not Operate' tag.
3. Relieve trapped pressure: Open the number 1 test cock (closest to inlet) slowly using a flathead screwdriver or wrench. Direct water into the bucket. Repeat for test cocks 2, 3, and 4 (if present). Leave all test cocks open to vent the assembly completely.
4. Remove the test cock caps: Using a screwdriver or wrench, unscrew each test cock cap. Inspect the O-ring for cuts, flattening, or brittleness. Replace any damaged O-rings with new ones lightly lubricated with silicone grease. Clean the cap threads with a rag and spray with diluted chlorine solution. Reinstall caps hand-tight, then torque to 20-30 in-lb (or per manufacturer spec). Do not overtighten.
5. Locate and clean the internal strainer: For RPZ devices, the strainer is typically located upstream of the first check valve. For DCVAs, it may be in the inlet shut-off valve or a separate Y-strainer. Remove the strainer retaining nut or bonnet using a pipe wrench. Extract the stainless steel screen. Rinse it with clean water and scrub with a nylon brush to remove sediment and debris. Reinstall the screen and tighten the retaining nut to 30-40 ft-lb (or per manufacturer spec).
6. Exercise the shut-off valves: With the valves still closed, slowly open each shut-off valve 1/4 turn to break any corrosion or scale buildup, then close again fully. Repeat this cycle 3 times. This ensures smooth operation during the test and prevents valve stem seizure.
7. Inspect the relief valve (RPZ only): For Reduced Pressure Zone assemblies, visually inspect the relief valve opening for any debris or signs of continuous weeping. If the relief valve is stuck open or leaking, note this on the work order for the certified tester. Do not attempt to disassemble the relief valve without proper training.
8. Check for external leaks: With the test cocks still open, slowly open the upstream shut-off valve 1/4 turn. Observe all joints, test cocks, and the relief valve for any drips. If a leak is found, tighten the fitting or replace the O-ring as needed. Close the upstream valve again.
9. Close all test cocks: Using a screwdriver or wrench, close each test cock fully (turn clockwise until snug). Do not overtighten. Wipe down the test cock area with a clean rag.
10. Restore normal operation: Open the upstream shut-off valve fully (counterclockwise). Wait 10 seconds for pressure to stabilize, then slowly open the downstream shut-off valve fully. Listen for any unusual sounds (water hammer, chatter) and check for leaks at all joints. If the relief valve discharges continuously for more than 30 seconds, close the downstream valve and contact the certified tester immediately.
11. Document the preparation: Record the backflow preventer model, serial number, date, and any observations (e.g., 'strainer cleaned, test cock O-rings replaced, no leaks') in the maintenance log or CMMS (ServiceGrid). Attach a tag indicating the device is ready for annual testing.

5.0 Verification & Return to Service

1. Verify that the backflow preventer is fully operational: With both shut-off valves open, confirm there is no continuous discharge from the relief valve (RPZ) and no audible leakage from any test cock or joint. Check the pressure gauge (if installed) to ensure line pressure is within normal range (typically 40-80 psi).
2. Perform a brief flow test: Open a downstream faucet or hydrant for 30 seconds to confirm adequate flow and pressure. Close the faucet and re-inspect the backflow preventer for any new leaks or relief valve discharge.
3. Remove all LOTO devices and tags. Notify facility management or the maintenance supervisor that the backflow preventer is prepared and ready for the annual certification test. Update the work order status in ServiceGrid to 'Awaiting Certification Test'.

4. If the certified tester identifies any issues during the test (e.g., check valve failure, relief valve malfunction), coordinate the necessary repairs immediately to maintain compliance. Do not leave the device in a non-compliant state.

Regulatory Disclaimer: This document is a generic maintenance template provided for educational and informational purposes only. It does not constitute professional engineering or reliability advice. The end-user assumes all liability for validating all step sequences, torque specs, and LOTO protocols against specific machinery OEM manuals before deployment to a live production floor.