



**BACKFLOW PREVENTION**

**AND**

**CROSS-CONNECTION CONTROL**

**POLICY**

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## **1. Purpose**

1.1.1 To protect the public potable water supply for the City of Shakopee, Minnesota, operated by Shakopee Public Utilities (SPU) from the possibility of contamination or pollution. This is accomplished by isolating, within the owner's internal distribution system, such contaminants or pollution sources that otherwise could backflow or back-siphon into the public potable water supply.

1.1.2 To promote the prevention of cross-connections, actual or potential, between the Owner's potable water system and the public potable water supply for the City of Shakopee, Minnesota. This is being accomplished by containment protection after the water meter to any Commercial, industrial, or multifamily premises.

1.1.3 To provide for the maintenance of a continuing backflow prevention and a cross-connection control policy that will systematically and effectively prevent the contamination or pollution of the public potable water supply for the City of Shakopee, Minnesota.

## **1.2 Responsibility**

1.2.1 SPU shall be responsible for the protection of the public potable water supply from contamination or pollution due to backflow or back-siphonage of contaminants or pollutants through the water service connection. If, in the judgment of SPU, an approved backflow preventer is required, notice in writing will be given to said Owner to install an approved backflow preventer at the water service entrance immediately downstream of the SPU-owned water meter on the premises at the Owner's expense. The Owner shall, within sixty (60) days, install such approved assembly or assemblies at their own expense, failure to, or refusal, or inability on the part of the Owner to install said assembly or assemblies within sixty (60) days, shall constitute grounds for discontinuing water service to the premises until such assembly or assemblies have been properly installed.

1.2.2 SPU will operate a Backflow Prevention and Cross-Connection Control Policy, to include the keeping of necessary records (see Section 6), which fulfills the requirements of the SPU Backflow Prevention and Cross-Connection Control Policy.

1.2.3 The Owner shall be responsible for ensuring the protection of the water system beyond the termination of SPU's public water system. This includes installing and maintaining all backflow preventer assemblies for containment and isolation purposes.

1.2.4 When SPU requires the public water supply to be protected by containment, the Owner shall provide the proper backflow prevention at the water service entrance to the premise/s immediately downstream of the SPU-owned water meter and shall be responsible for water quality beyond the outlet end of the backflow preventer assembly. The Owner shall utilize point-of-use protection as required by the City of Shakopee Building

Department.

### **1.3 Authority**

1.3.1 The Federal Safe Drinking Water Act of 1974 SDWA, MN Water Supply Rule 4720.0025

1.3.2 SPU, the water purveyor having jurisdiction in charge of the public water system, is vested with authority and responsibility for the implementation of an effective Cross Connection Control and Backflow Prevention Policy and the enforcement of the provisions of this specification.

## **2. Definitions**

The following definitions shall apply to this specification.

### **2.1 Terms**

2.1.1 Approved: Accepted by SPU as meeting an applicable specification stated or cited in this regulation, or as suitable for the proposed use.

2.1.2 Approved: When used in reference to an air gap, pressure vacuum breaker assembly, a double check valve assembly, a reduced pressure principle backflow prevention assembly, or other backflow prevention assemblies, devices, or methods shall mean any such assembly, device, or method approved by The City of Shakopee Building Department.

2.2 Auxiliary Water Supply: Any water supply on or available to the premises other than SPU's water supply will be considered as an auxiliary water supply. These auxiliary waters may include water from another city's water utility or public potable water supply, or any natural source(s) such as a well, spring, river, stream, harbor, etc., or used water of industrial fluids. These waters may be contaminated or polluted, or they may be objectionable and constitute an unacceptable water source over which SPU does not have sanitary control.

2.3 Backflow: The flow of water or other liquids, mixtures, or substances, under

2.4 Backflow Preventer Assembly: A testable backflow prevention assembly, which inhibits backflow or back-siphonage into the public potable water supply. Most commonly categorized as a double check valve assembly (DCV), pressure vacuum breaker assembly (PVB), Spill Resistant vacuum breaker (SVB), or reduced pressure zone assembly (RPZ).

2.4.1 Air Gap: A physical separation between the free-flowing discharge end of a potable

water supply pipeline and an open and non-pressure receiving vessel.

2.4.2 Approved Air Gap: Shall be at least double the diameter of the supply pipe measured vertically above the flood rim of the fixture, but in no case less than 1”.

2.4.3 Atmospheric Vacuum Breaker (AVB) (ASSE 1001): A device that performs similarly to a pressure vacuum breaker assembly. The AVB consists of a float check, a check seat, and an air inlet port. During normal flow conditions, the float within the AVB seals against the air inlet seat. When a back-siphonage condition develops, the cessation of normal flow permits the float to drop, thus opening the air inlet valve. If the float seals against a check seat, there is no back siphonage from the AVB body or downstream piping. However, if the float check is fouled, the air entering through the air inlet valve dissipates. An AVB shall not be installed where it will be in continuous operation for more than 12 hours.

2.4.4 Double Check Valve Backflow Prevention Assembly (DCV) (ASSE 1015): An assembly composed of two (2) independently acting approved check valves, including tightly closing resilient seated shutoff valves attached at each end of the assembly and fitted with properly located resilient seated test cocks. This assembly shall only be used to protect against a non-health hazard (i.e., pollutant).

2.4.5 Double Check Detector Fire Protection Backflow Prevention Assembly (DCDA) (ASSE1048): An assembly composed of two (2) independently acting approved check valves with a parallel detector assembly consisting of a water meter and a double check valve backflow prevention assembly, including tightly closing resilient seated shutoff valves attached at each end of the assembly and fitted with properly located resilient seated test cocks. This assembly shall only be used to protect against a non-health hazard (i.e., pollutant)

2.4.6 Pressure Vacuum Breaker (PVB) (ASSE 1020): An assembly that consists of an independently operating internally loaded check valve and an independently operating loaded air inlet valve located on the discharge side of the check valve, with properly located resilient seated test cocks and tightly closing resilient seated shutoff valves attached at each end of the assembly.

2.4.7 Reduced Pressure Principle Backflow Prevention Assembly (RPZ) (ASSE 1013): An assembly containing two (2) independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first checkvalve. The unit shall include properly located resilient seated test cocks and tightly closing resilient shutoff valves at each end of the assembly. This assembly is used to protect against a non-health (i.e., pollutant) or a health hazard (i.e., contaminant).

2.4.8 Spill-Resistant Vacuum Breaker (SVB) (ASSE 1056): A type of cross-connection control assembly which contains a check valve force – loaded closed and an air inlet vent valve force - loaded open to the atmosphere, positioned downstream of the check valve, and located between and including two (2) tightly closing shutoff valves and two (2) test cocks.

2.5 Backpressure: A condition in which the building plumbing system pressure is greater than the supplier's system pressure.

2.6 Back siphonage: The flow of water or other liquids, mixtures, or substances into the distribution pipes of a potable water supply system from any source other than its intended source caused by the sudden reduction of pressure in the potable water supply system.

2.7 City of Shakopee Building Department: Authority Having Jurisdiction to enforce the Minnesota Plumbing Code.

2.8 City of Shakopee Fire Department: Authority Having Jurisdiction to enforce the Minnesota State Fire Code.

2.9 Containment: A method of backflow prevention that requires backflow prevention at the water service entrance to the premise(s) immediately downstream of the SPU-owned water meter

2.10 Contaminant: A substance that impairs the quality of the water to a degree that it creates a serious health hazard to the public, leading to poisoning or the spread of disease.

2.11 Cross Connection: Any connection between the public water supply and a source of contamination or pollution.

2.12 Isolation: A method of backflow prevention in which a backflow preventer is located at the source or "point of use" of the potential hazard to correct a cross-connection at a location within the owner's building or facility.

2.13 Owner: Any person, who has legal title to a property or a license to operate or inhabit a property.

2.14 Person: Any individual, partnership, company, public or private corporation, political subdivision or agency of the State Department, agency or instrumentality of the

United States, or any other legal entity.

2.15 Physical Disconnection: A physically measured separation of the water supply piping to eliminate the potential of a cross-connection between the public water system and an auxiliary water system. An installed backflow preventer assembly between the municipally supplied water system and an auxiliary water system does not meet the requirements of this document for a physical disconnection.

2.16 Pollutant: A foreign substance that, if introduced into the public water system, will degrade its quality, constituting a moderate hazard, or impair the usefulness or quality of the water to a degree that does not create an actual hazard to the public health, but that does adversely and unreasonably affect such water for domestic use.

2.17 Private fire protection water service: A water service line that is supplied by SPU, but is owned and maintained by the Owner, for the sole purpose of fire protection on the Owner's property. These services can serve fire suppression systems, private fire hydrants, or a combination of both.

2.18 Shakopee Public Utilities (SPU): Water purveyor for the City of Shakopee, Minnesota.

2.19 Water Service Entrance: The point in the Owner's water system beyond the sanitary control of SPU; generally considered to be the outlet end of the SPU-owned water meter and always before any unprotected branch.

2.20 Water System: The water system shall be considered as made of two (2) parts. The SPU public water system and the Owner's system.

### **3. REQUIREMENTS**

#### **3.1 SPU**

3.1.1 For new Commercial, Industrial, Apartment, Multifamily (containing more than one unit and has a shared laundry facility), Institutional, and Dedicated Lawn Irrigation Service installations; a Reduced Pressure Zone (RPZ) shall be installed immediately downstream of the SPU-owned water meter regardless of the degree of hazard within the building (Containment). If a bypass line and meter are installed, an additional Reduced Pressure Zone (RPZ) shall be installed immediately downstream of the SPU-owned water meter on the bypass line.

3.1.2 For Commercial, Industrial, Apartment, Residential (containing more than one unit and has a shared laundry facility), Institutional, and service Installations existing prior to the

start of this program; SPU staff, or an SPU-designated representative, may evaluate the potential backflow into the public water system (Containment) and inform the Owner by letter of any corrective action deemed necessary, the method of achieving the correction and the time allowed for the correction to be made. Ordinarily, sixty (60) days will be allowed; however, this period may be shortened or lengthened depending on the degree of hazard involved.

### **3.1.3 Properties with an Auxiliary Water Supply.**

3.1.3.1 Water pipes supplied by the SPU public water system must not be connected to any pump, well, or tank that is linked to an auxiliary water supply.

3.1.3.2 Single Family Residential- A physical disconnection of water supply piping between the interior potable plumbing and the non-potable auxiliary water system must exist when a residential property is utilizing an auxiliary water supply for outside watering purposes. A testable double-check valve must be installed immediately downstream of the SPU-owned water meter to protect the municipal water system from any potential cross-connection.

3.1.3.3 Commercial, Industrial, Residential (containing more than one unit with shared laundry facilities), and Institutional. A physical disconnection of the water supply piping between the municipally supplied water and the auxiliary water supply is required. A Reduced Pressure Zone (RPZ) shall be installed immediately downstream of the SPU owned water meter.

3.1.3.4 The Owner will be notified by mail of any cross-connection violation. The Owner will have sixty (60) days to correct the violation. If the violation has not been corrected after sixty (60) days, SPU may terminate water service to the premises. In the event the Owner informs SPU of extenuating circumstances as to why the correction of the violation has not been made, a time extension may be granted by SPU, but in no case will it exceed an additional thirty (30) days. If SPU determines at any time that a serious threat to public health exists, the water service may be terminated immediately.

3.1.4 For any Residential or Commercial irrigation system, a Pressure Vacuum Breaker (PVB) or Reduced Pressure Zone (RPZ) backflow preventer assembly shall be installed. Irrigation systems that are supplied by a dedicated water service line or are plumbed with an SPU-owned irrigation-only water meter must have an RPZ installed immediately downstream of the water meter. For a single-family residential irrigation system or a commercial irrigation system that is supplied after the SPU-owned domestic water meter, a PVB is an acceptable backflow prevention device.

3.1.5 Private fire water services and/or private fire hydrant service leads that are over the standard 20' length may be required to be protected by a Double Check Valve Backflow Prevention Assembly (DCV). When required, the Double Check Valve Detector Assembly (DCDA) is to be located above ground in a heated structure that meets the requirements of



ASSE 1060 for access and testing purposes. SPU will make the determination when a Double Check Valve Detector Assembly (DCVA) is required on a private fire protection water service.

3.1.6 Fire suppression systems shall have a Double Check Valve Detector Assembly (DCDA) Backflow Prevention Assembly installed per the requirements of the Shakopee Fire Department, City of Shakopee Building Department, and SPU.

### **3.2 Owner**

3.2.1 The Owner is responsible for the prevention and elimination of all cross-connections on their premises. SPU will assist the Owner with the identification of any cross-connection when requested.

3.2.2 The Owner, after having been informed by a letter from SPU, must at their expense, install, maintain, and test, or have tested, any backflow preventer assemblies on their premises.

3.2.3 The Owner must correct any malfunction of the backflow preventer assembly.

3.2.4 The Owner must not install a bypass around any backflow preventer assembly unless there is a backflow preventer assembly of the same type on the bypass. Owners who cannot shut down operations for testing of the backflow preventer assembly(s) must install an additional SPU-owned water meter and backflow preventer assembly as necessary to allow testing to take place.

3.2.5 The Owner must install backflow preventer assemblies in a manner approved by the City of Shakopee Building Department or SPU.

3.2.7 The Owner shall be responsible for the payment of all fees for permits, testing, repairs, and additional required retesting in cases where the backflow preventer assembly fails to operate correctly.

3.2.8 The Owner shall inform SPU and the City of Shakopee Building Department of any known, proposed, existing, or modified cross-connections.

3.2.9 The Owner is responsible for ensuring all points of use are protected with the proper backflow preventer assemblies per the City of Shakopee Building Department.

### **4. EXISTING BACKFLOW PREVENTER ASSEMBLIES**

4.1 Any existing backflow preventer assembly shall be allowed to continue in service

until or unless the degree of hazard is such as to supersede the effectiveness of the present backflow preventer assembly or result in an unreasonable risk to public health. If the Owner of a premise wishes to remove an existing backflow preventer assembly from service, prior approval must be obtained from SPU and the City of Shakopee Building Department before doing so.

## **5. PERIODIC TESTING AND MAINTENANCE**

5.1 All-new testable backflow preventer assemblies must be tested upon installation.

5.2 All testable backflow preventer assemblies, regardless of the install date, must be tested at intervals not to exceed twelve (12) months from the date of the previous test date by an American Society of Sanitary Engineers (ASSE) certified backflow preventer tester and shall be submitted to SPU, via The Compliance Engine, no more than thirty (30) days after the test date. Any backflow repair needs to be completed by a Licensed Plumber.

5.3 Any backflow preventer assembly that fails during a periodic test must be immediately repaired or replaced. Upon completion of the repair or replacement, the backflow preventer assembly must be retested at the owner's expense to ensure proper operation

5.4 SPU may require more frequent backflow preventer assembly testing in cases where there is a history of test failures or where SPU determines that, due to the degree of hazard involved, additional testing is warranted. The cost of the additional tests will be the responsibility of the Owner.

5.5 The State of Minnesota requires backflow preventer assemblies on all in-ground irrigation systems. The testing of all irrigation system backflow preventer devices must be completed each year, preferably at the time of the system start-up. This is due to the nature of the system being taken in/out of service to protect it from our local climate.

## **6. RECORDS AND REPORTS**

6.1 Records: SPU staff or a representative of SPU will initiate and maintain a master database on all customer-owned containment backflow preventer assemblies and tests required by this program.

6.2 Private Records: SPU staff or a representative of SPU will initiate and maintain a master database on all Owner's testable private isolation "point of use" backflow preventer assemblies.

6.3 SPU utilizes The Compliance Engine to track backflow prevention reporting. It shall

be the responsibility of the backflow tester to enter the test reports and pay any associated fees with submitting the reports through their website [www.thecomplianceengine.com](http://www.thecomplianceengine.com). Any backflow test reports that are submitted directly to SPU or the City of Shakopee will not be accepted and will be considered delinquent until they are entered by the backflow tester into The Compliance Engine database.

## **7. Lockout Process**

7.1 Residential irrigation Lock-outs can be enacted through two means. Firstly, at the request of the customer, to avoid the annual testing requirement. Secondly, SPU may issue a lock-out due to non-compliance. A tamper seal and lock-out tag will be affixed to the backflow preventer. While a system is under lockout, it must not be utilized. Moreover, to qualify for lock-out status, the system must be winterized. Lock-out requests must be made at:

[https://shakopeepublicutilities.formstack.com/forms/irrigation\\_system\\_lockout\\_request](https://shakopeepublicutilities.formstack.com/forms/irrigation_system_lockout_request)

7.2 Removal of Backflow Lock-Out Tag: Only SPU is authorized to remove the tamper seal and lock-out tag. Any alteration or removal of these by unauthorized individuals will incur a non-refundable penalty of \$250.00 charged to the owner's utility account. Unlock requests must be requested at:

[https://shakopeepublicutilities.formstack.com/forms/irrigation\\_system\\_unlock\\_request](https://shakopeepublicutilities.formstack.com/forms/irrigation_system_unlock_request)

7.3 If a lockout of a backflow assembly cannot be performed for non-compliance, water may be shut off to the property.

## **8. Failure to Comply**

### **8.1 Commercial and Industrial Customers**

If an assembly is not tested within 30 days past the annual due date, it is considered delinquent. The Compliance Engine will send a deficiency notice to the owner approximately 45 days after the annual renewal date.

A penalty of \$200.00 (per device) will be imposed if test results are not received within 30 days after the annual testing due date of the assembly. This penalty will continue until the assembly is tested and a passing test result is submitted.

Upon request by the customer, the testing penalty may be refunded with a successful test submission to The Compliance Engine within 60 days of receiving the penalty. Only one \$200.00 (per device) penalty will be refunded per year.

If the backflow preventer test fails, the owner must repair and/or replace the device within 30 days

SPU may discontinue water service at any time if a backflow assembly is not tested or if a hazard exists to the municipal water system.

## 8.2 Residential Customers

If an assembly is not tested and submitted within 30 days past the due date, it is considered delinquent. A past due notice will be sent approximately 45 days after the due date to the contact on file within The Compliance Engine.

For delinquent accounts, a one-time, annual testing penalty of \$150 will be imposed on the following month's billing statement if test results are not submitted (or submitted test results indicate a failed test) by the cut-off before the billing date (approximately ten days before the scheduled billing date).

If the backflow preventer test fails, the owner must repair and/or replace the device within 30 days of the failed test results and a successful test submitted. No additional testing penalties will be imposed.

At the same time, the owner's irrigation system will be in a lock-out status. Lock-outs will be conducted by SPU, with the majority being completed in the off-season. This will prevent irrigation water usage in the following season without proper testing.

Upon request by the customer, the testing penalty may be refunded with a successful test submission to The Compliance Engine within 60 days of receiving the penalty.

## 9. Degree of Hazard Table

TABLE 603.2  
BACKFLOW PREVENTION DEVICES, ASSEMBLIES, AND METHODS

DEGREE OF HAZARD						
DEVICE, ASSEMBLY, OR METHOD <sup>1</sup>	APPLICABLE STANDARDS	POLLUTION (LOW HAZARD)		CONTAMINATION (HIGH HAZARD)		INSTALLATION <sup>2,3</sup>
		BACK- SIPHONAGE	BACK- PRESSURE	BACK- SIPHONAGE	BACK- PRESSURE	
Air gap	ASME A112.1.2	X	—	X	—	See Table 603.3.1 in this chapter.
Air gap fittings for use with plumbing fixtures, appliances and appurtenances	ASME A112.1.3	X	—	X	—	Air gap fitting is a device with an internal air gap and typical installation includes plumbing fixtures, appliances and appurtenances. The critical level shall not be installed below the flood level rim.
Atmospheric vacuum breaker (consists of a body, checking member and atmospheric port)	ASSE 1001 or CSA B64.1.1	X	—	X	—	Upright position. No valve downstream. Minimum of 6 inches or listed distance above all downstream piping and flood-level rim of receptor. <sup>4,5</sup>
Antisiphon fill valve (ball- cocks) for gravity water closet flush tanks and urinal tanks	ASSE 1002 or CSA B125.3	X	—	X	—	Installation on gravity water closet flush tank and urinal tanks with the fill valve installed with the critical level not less than 1 inch above the opening of the overflow pipe. <sup>4,5</sup>
Vacuum breaker wall hydrants, hose bibbs, frost resistant, automatic draining type	ASSE 1019 or CSA B64.2.1.1	X	—	X	—	Installation includes wall hydrants and hose bibbs. Such devices are not for use under continuous pressure conditions (means of shutoff downstream of device is prohibited). <sup>4,5</sup>
Backflow preventer for Carbonated Beverage Dispensers (two independent check valves with a vent to the atmosphere)	ASSE 1022	X	—	—	—	Installation includes carbonated beverage machines or dispensers. These devices operate under intermittent or continuous pressure conditions.
Spill-Resistant Pressure Vacuum Breaker (single check valve with air inlet vent and means of field testing).	ASSE 1056	X	—	X	—	Upright position. Minimum of 12 inches or listed distance above all downstream piping and flood-level rim of receptor. <sup>5</sup>
Double Check Valve Back- flow Prevention Assembly (two independent check valves and means of field testing)	ASSE 1015; AWWA C510; CSA B64.5 or CSA B64.5.1	X	X	—	—	Horizontal unless otherwise listed. Access and clearance shall be in accordance with the manufacturer's instructions, and not less than a 12 inch clearance at bottom for maintenance. May need platform/ladder for test and repair. Does not discharge water.
Double Check Detector Fire Protection Backflow Prevention Assembly (two independent check valves with a parallel detector assembly consisting of a water meter and a double check valve backflow prevention assembly and means of field testing)	ASSE 1048	X	X	—	—	Horizontal unless otherwise listed. Access and clearance shall be in accordance with the manufacturer's instructions, and not less than a 12 inch clearance at bottom for maintenance. May need platform/ladder for test and repair. Does not discharge water. Installation includes a fire protection system and is designed to operate under continuous pressure conditions.

**TABLE 603.2  
BACKFLOW PREVENTION DEVICES, ASSEMBLIES, AND METHODS (continued)**

DEGREE OF HAZARD						
DEVICE, ASSEMBLY, OR METHOD <sup>1</sup>	APPLICABLE STANDARDS	POLLUTION (LOW HAZARD)		CONTAMINATION (HIGH HAZARD)		INSTALLATION <sup>2,3</sup>
		BACK-SIPHONAGE	BACK-PRESSURE	BACK-SIPHONAGE	BACK-PRESSURE	
Pressure Vacuum Breaker Backflow Prevention Assembly (loaded air inlet valve, internally loaded check valve and means of field testing)	ASSE 1020 or CSA B64.1.2	X	—	X	—	Upright position. May have valves downstream. Minimum of 12 inches above all downstream piping and flood-level rim of receptor. May discharge water.
Reduced Pressure Principle Backflow Prevention Assembly (two independently acting loaded check valves, a differential pressure relief valve and means of field testing)	ASSE 1013; AWWA C511; CSA B64.4 or CSA B64.4.1	X	X	X	X	Horizontal unless otherwise listed. Access and clearance shall be in accordance with the manufacturer's instructions, and not less than a 12 inch clearance at bottom for maintenance. May need platform/ladder for test and repair. May discharge water.
Reduced Pressure Detector Fire Protection Backflow Prevention Assembly (two independently acting loaded check valves, a differential pressure relief valve, with a parallel detector assembly consisting of a water meter and a reduced-pressure principle backflow prevention assembly, and means of field testing)	ASSE 1047	X	X	X	X	Horizontal unless otherwise listed. Access and clearance shall be in accordance with the manufacturer's instructions, and not less than a 12 inch clearance at bottom for maintenance. May need platform/ladder for test and repair. May discharge water. Installation includes a fire protection system and is designed to operate under continuous pressure conditions.

For SI units: 1 inch = 25.4 mm

**Notes:**

- <sup>1</sup> See description of devices and assemblies in this chapter.
- <sup>2</sup> Installation in pit or vault requires previous approval by the Authority Having Jurisdiction.
- <sup>3</sup> Refer to general and specific requirement for installation.
- <sup>4</sup> Not to be subjected to operating pressure for more than 12 hours in a 24 hour period.
- <sup>5</sup> For deck-mounted and equipment-mounted vacuum breaker, see Section 603.5.14.