

**CROSS CONNECTION CONTROL  
STANDARDS & SPECIFICATIONS**  
July 2014



CITY OF SURREY

**CROSS CONNECTION CONTROL  
STANDARDS & SPECIFICATIONS**

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## 1. GENERAL

### 1.1. Intent of This Standard

This Standard provides:

- (a) clarification regarding the City's requirements and acceptable solutions relating to the protection of *potable water* through the selection and installation of:
  - *backflow preventers*;
  - *heat exchangers*; and
  - the arrangement *water* piping.
- (b) requirements specific to the City for the field testing, repair, and replacement of backflow preventers
- (c) that which is permissible within the limits of this standard, CSA standards, or the B.C. Plumbing Code, 2012.

In this Standard, "shall" is used to express a requirement, "should" is used to express a recommendation, and "may" is used to express a permissible option.

### 1.2 Documents

The following City By-laws, specifications, standards, and other guidelines shall govern and take precedence in the following order, with the British Columbia Plumbing Code, 2012 taking precedence over all of the following documents:

- (a) Waterworks Regulations & Charges By-law;
- (b) Waterworks Cross Connection Control By-law;
- (c) Plumbing By-law;
- (d) This Standards and Specifications;
- (e) CAN/CSA-B64.10-11, "Manual for the Selection and Installation of Backflow Prevention Devices"; and
- (f) B64 series -11 backflow preventers and vacuum breakers.

### 1.3 Permits and Documentation

The following installation/replacement/removal works requires the submission of a City plumbing permit as required by City's Planning and Development Department:

- *backflow preventer*;
- *registered air gap*;
- all equipment where potable water is being used, such as heat exchanger and chemical feed system; and
- replacement of a backflow preventer and/or *registered air gap* that is of a different type than the original backflow preventer.

The application for a plumbing permit associated with the installation of a backflow preventer shall include all of the following information:

- i. a list showing all equipment and plumbing fixture and the respective backflow preventer type;
- ii. documentation supporting the approval of variance of installation methodologies from manufacturer's instruction, applicable approval agencies, and this Standard; and
- iii. design plans, schematic or other design information to provide for the location, isolation type, and protection against the respective hazard.

#### **1.4. Reference Publications**

This Standard refers to the following publications. Where editions are referenced, it shall apply to the edition as listed below, or as they are amended from time to time.

- Surrey Municipal Ticket Information Utilization By-law, 1994, No. 12508
- CAN/CSA B64.10.1-07 or current version, "Selection and installation of backflow preventers/Maintenance and field testing of backflow preventers"
- CAN/CSA B64 Series 07 or current version, "*Backflow Preventers* and Vacuum Breakers"
- CAN/CSA B128.1-06 or current version, "Design and Installation of Non-potable Water Systems"
- CAN/CGSB-24.3-92 or current version – Identification of Piping Systems
- City of Surrey Water Meter Design Criteria and Supplementary Specifications
- University of Southern California Foundation for Cross Connection Control and Hydraulic Research (USC FCCCHR) - USC FCCCHR List of Approved Backflow Prevention Assemblies

## **2. DEFINITIONS AND ABBREVIATIONS**

### **2.1. Definitions**

Words used in this Standards & Specifications document shall have the same meaning as City of Surrey Waterworks Regulation and Charges By-law and Cross Connection Control By-law. Words and phrases that are not included in the By-laws are defined below.

**Auxiliary water supply** means any water supply on or available to the premises other than from the Waterworks.

**Building** means any structure used or intended for supporting or sheltering any use or *occupancy*.

**City Cross Connection Control By-law** means the Surrey Waterworks Cross Connection Control By-law, 2013, No. 17988, as amended from time to time.

**City Water By-law** means the Surrey Waterworks Regulation and Charges By-law, 2007, No. 16337, as amended from time to time.

**Combined water service pipe** means a pipe that conveys *water* from the *waterworks* to within a *parcel* for both domestic purposes and fire fighting.

**Connection** means the connecting piping to a single appliance, appurtenance, equipment, plumbing fixture, hose connection, hydrant, irrigation system, piping system, reservoir, vessel, or *water* discharge point from a *water* piping system or the *waterworks* system.

**Fire service isolation** means the effective backflow protection provided to the *waterworks* by a *backflow preventer* installed on a *fire service pipe* to provide *isolation* from a fire protection system located within a *parcel*.

**Fire service pipe** means a pipe that conveys *water* from:

- (a) the *waterworks* to within a *parcel* for firefighting purposes only; or
- (b) a *combined service pipe* to one or more fire sprinkler/standpipe system(s) and/or hydrant(s).

**Group isolation** means the *isolation* of a limited number of *cross connections* of identical *hazard types* provided by a single *backflow preventer*.

**Heat Exchanger** means an apparatus designed specifically to transfer heat energy between two fluids or a fluid and a gas and where the two mediums are physically separated. See *plumbing code* definition “indirect service water heater”.

**Point of Use isolation** means the *isolation* of a *cross connection* provided by a single *backflow preventer* or a combination of *backflow preventers* located on a *connection* to or within a plumbing fixture.

**Industrial, Commercial, Institutional** means the usage of a *parcel* or *real property* that is other than residential usage or, where only portions are of residential usage, those portions that are not *dwelling units*.

**Integral air gap** means an *air gap* supplied by the manufacturer as an integral part of a plumbing fixture that is intended as a means to provide *isolation* of the plumbing fixture.

**Isolate, isolated, or isolation** means the practice of providing protection to *water*, the *waterworks* system, and/or a *water* piping system from backflow.

**Minor or minor hazard** means the *degree of hazard* of a *cross connection* which does not have the ability to affect health but may be aesthetically objectionable such that it can affect only the taste, odour, and/or colour of *water* and/or cause an increase in *water* temperature above 65° C in amounts of 45 litres or less.

**Moderate or moderate hazard** means the *degree of hazard* of a *cross connection* that creates a *threat* which has a low probability as to affect health or may cause burns or physical damage due to an increase in temperature of *water* above 65° C in amounts greater than 45 litres.

**Multi-family residential** means a *building* or *parcel*, *real property*, or portion thereof meant for *residential occupancy* and contains more than three *dwelling units*.

**Non-potable water system** means any water system with water supply from Waterworks but is not intended or safe for human consumption.

**Potable connection** means a *connection* that requires the *water* supplied to the *connection* be *potable water* in order to safeguard health.

**Registered air gap** means an *air gap* that is registered with the *City's cross connection* control program and subject to the inspection and reporting requirements of the *City Cross Connection Control By-law*.

**Restricted access** means a *parcel*, *real property*, *building*, or facility of a usage other than *residential occupancy* that is exempt from the statutes or statutory provisions of the *City Cross Connection Control By-law*, the *City Water By-law* or the *plumbing code*.

**Severe or severe hazard** means the *degree of hazard* of a *cross connection* that creates a *threat* which has a greater than low probability to affect health that includes, but is not limited to:

- (a) biological hazards such as bodily fluids, harmful bacteria, and viruses;
- (b) the introduction of chemicals, soaps, detergent, and other additives which have a toxic rating and are not suitable for human consumption;
- (c) large volumes of *water* not maintained in a potable condition; and/or
- (d) any condition where there is the possibility of a circumstance that may cause physical damage to the *waterworks system* or *can create a danger to health*.

**Single family dwelling** means a *parcel* containing a single detached *building* for *residential occupancy* and consisting of no more than three *dwelling units*.

**Test procedures** means those field test procedures as contained in the CAN/CSA B64.10.1-07 or current version, "Selection and installation of backflow preventers/Maintenance and field testing of backflow preventers".

**Threat** means a condition or thing, or circumstances that may lead to a condition or thing that may result in the degradation of the quality of *water* such that it may no longer be *potable water*.

**Unit** means a single room or series of rooms of complementary use, operated under a single tenancy, and includes individual stores and individual or complementary rooms for institutional, commercial, or industrial occupancies.

**Vacuum breaker** means a *backflow prevention device* designed to prevent backflow due to back-siphonage. Identified in the *plumbing code* as “back-siphonage preventer.”

**Water service pipe** means a pipe that conveys *water* from:

- (a) the *waterworks* to a *water* piping system within a *parcel*; or
- (b) a *combined water service pipe* to a *water* piping system for *normal use*.

**Zone isolation** means the effective backflow protection provided to *potable water* piping within a *real property* by a *backflow preventer* installed to provide *isolation* from a piping system or systems supplying only non-potable *connections*.

## 2.2. Abbreviations

The abbreviations listed below are those used in this standard:

Air Gap	AG
Atmospheric <i>Vacuum Breaker</i>	AVB
Carbon Dioxide	CO2
Double Check Valve Assembly	DCVA
Double Check-Detector <i>Assembly</i>	DCDA
<i>Heat Exchanger</i> - Double Wall	DW
<i>Heat Exchanger</i> - Double Wall with Leak Path/Detection	DWLP
<i>Heat Exchanger</i> - Single Wall	SW
Dual Check Valve	DuC
Dual Check Valve with Atmospheric Port	DCAP
Dual Check Valve with Atmospheric Port for Carbonators	DCAPC
Dual Check Valve with Intermediate Vent	DuCV
Exposed Tube Wraparound <i>Heat Exchanger</i>	ETW
Foundation for Cross Connection Control and Hydraulic Research	FCCCHR
Hose Connection Dual Check <i>Vacuum Breaker</i>	HCDVB
Hose Connection <i>Vacuum Breaker</i>	HCVB
<i>Industrial, Commercial, Institutional</i>	ICI
Laboratory Faucet <i>Vacuum Breaker</i>	LFVB
<i>Multi-Family Residential</i>	MFR
Per Square Inch Differential	Pounds
	PSID
	Pounds
Per Square Inch Gauge	PSIG
Pressure <i>Vacuum Breaker</i>	PVB
Reduced Pressure Principle <i>Backflow Prevention Assembly</i>	RP
Reduced Pressure Principle - Detector <i>Assembly</i>	RPDA
<i>Single Family Dwelling</i>	SFD
Spill Resistant Pressure <i>Vacuum Breaker</i> Assembly	SRPVB

Refer to the previously referenced CSA standards for other definitions and abbreviations.



### 3. BACKFLOW PREVENTERS

#### 3.1 Types of Backflow Preventers

There are three methods to provide backflow prevention:

- Arrangement of piping layout to provide an air gap;
- Installation of testable backflow prevention device; and
- Installation of non-testable backflow prevention devices.

Mechanical backflow preventers shall be on the list of Approved Assemblies by FCCCHR and shall not be altered once shipped from the manufacturer other than to provide for:

- (a) the correct *water* meter and a *water* meter's remote touch read pad register as described in Clause 3.3; or
- (b) renewal of an *acceptable* identification plate under this Standard.

#### 3.2. Air Gap

Every air gap shall be a minimum of at least twice the inside diameter of the inlet pipe, but not less than 25mm.

An *air gap* shall not be located in an area subject to flooding.

An *integral air gap* shall be *acceptable* as a means of *point of use isolation* for common plumbing fixtures. An integral air gap may be acceptable if the manufacturer's documentation, such as shop drawings, clearly demonstrates that the air gap meets the requirements of this Standard.

Every *air gap* providing the following isolation shall be a registered air gap:

- *premise isolation*;
- *fire service isolation*;
- *area isolation*;
- *zone isolation*;
- *isolation of a non-potable water system*; or
- *isolation of any severe hazard*.

#### 3.3. Testable Backflow Preventer Devices

Acceptable detector type *testable backflow prevention* devices include:

- (a) Reduced Pressure Principle - Detector Assembly (RPDA); and
- (b) Double Check-Detector Assembly (DCDA).

Detector-type testable *backflow prevention devices* shall be equipped with meters that are approved as compatible under the City of Surrey Water Meter Design Criteria and Supplementary Specifications.

Except for detector-type testable *backflow prevention devices* shall be of a type and conform to the applicable CSA standard as listed in Table 3.3.2.

**Table 3.3.2.  
Acceptable Testable Backflow Prevention Devices**

Type of Testable Backflow Prevention Devices	Applicable CSA Standard
Vacuum Breaker, Air Space Type (ASVB)	CSA B64.1.4
Reduced Pressure Principle Backflow Prevention Assembly (RP)	CSA B64.4
Double Check Valve Assembly (DCVA)	CSA B64.5
Pressure Vacuum Breaker Assembly (PVB)	CSA B64.1.2
Single Check Valve Type for Fire Systems (SCVAF)	CSA B64.9
Spill-Resistant Pressure Vacuum Breaker (SRPVB)	CSA B64.1.3

**3.4. Non-Testable Backflow Prevention Devices**

Non-testable *backflow prevention device* shall be of a type and conform to applicable CSA standard as listed in Table 3.4.

**Table 3.4.  
Acceptable Non-Testable Backflow Prevention Devices**

Type of Acceptable Backflow Prevention Device	Applicable CSA Standard
Atmospheric Vacuum Breaker (AVB)	B64.1.1
Lab Faucet Vacuum Breaker (LFVB)	B64.7
Hose Connection Vacuum Breaker (HCVB)	B64.2
Hose Connection Vacuum Breaker w/manual drain feature (HCVB)	B64.2.1
Hose Connection Vacuum Breaker w/automatic drain feature (HCVB)	B64.2.2
Hose Connection Vacuum Breaker – dual check type (HCVB)	B64.2.1.1
Dual Check Valve (DuC)	B64.6
Dual Check Valve with Atmospheric Port (DCAP)	B64.3
Dual Check Valve with Atmospheric Port for Carbonators (DCAPC)	B64.3.1
Dual Check Valve with intermediate vent (DuCV)	B64.8
Dual Check Valve for fire systems (DuCF)	B64.6.1

## **4. PROTECTION OF THE WATERWORKS**

### **4.1 Method of Protection**

Protection of backflow of pollutants and contaminants into the City's Waterworks and private water distribution system shall be provided by the installation of backflow preventers by:

- *Premise and/or area/zone isolation*: provide protection against backflow from private water distribution system into City's Waterworks;
- *Fire service isolation*: similar to premise isolation and/or area/zone isolation, but for isolation of fire service system;
- *Area or zone isolation*: provide protection against backflow from a section of piping system, which may be required under certain conditions;
- *Group isolation*: provide protection against backflow from a group of identical or similar point of use cross connections, which may be required under certain conditions; and
- *Point of use isolation*: provide isolation against one cross connection.

The following sections provide guidelines for the selection of backflow preventers for different types of hazards and premises. Figure 1 provides a schematic illustration of different types of isolation for explanatory purpose only. When there is conflict or uncertainty, CSA standard should be referenced; if a conflict or uncertainty still exists, the General Manager, Engineering shall determine the degree of hazard and appropriate method of protection.

### **4.2 Premise Isolation**

#### **4.2.1. Requirements**

*Backflow preventer(s) shall be installed to provide premise isolation on each new or existing water service connection supplying water to a real property. New service connection, including those for construction use, would only be available for use to provide continuous water supply after the installation and testing of the backflow preventer, if applicable, to the satisfaction of General Manager, Engineering.*

No branch piping or fixture, other than installation of a meter and its appurtenance, shall be connected to a *water service pipe* upstream of *backflow preventer providing premise isolation*. One backflow preventer providing premise isolation is allowed for each service connection, but parallel installation intended to provide continuous water supply during repair or replacement of backflow preventer is also allowed.

**4.2.2. Location**

The location of backflow preventer(s) providing premise isolation may be located immediately within the property line of a parcel or within a building without any branching off.

Backflow preventer(s) providing premise isolation shall be located downstream of the water meter. Where an RP is required for premise isolation, it must be located in an area not subject to flooding. Allow for proper drainage to accommodate the discharge rate of the particular model, make, and size of the RP.

**4.2.3. Selection**

Backflow preventers providing premise isolation shall be selected based on the *degree of hazard of a parcel, real property, building, or facility*, as determined in accordance with Appendix I. The *General Manager, Engineering* shall determine the *degree of hazard* for any single parcel not listed in Appendix I.

Where a single parcel or real property, classified as moderate hazard based on general land use and zoning in accordance with Appendix I and Appendix II, contains facilities of severe hazard classification, the General Manager, Engineering may determine that the parcel or real property be premise isolated by a double check valve assembly provided that:

- all point of use cross connection of a severe hazard classification is protected by a RP or air gap; and
- the building, unit, or area containing one or more point of use severe hazards is additionally protected by an RP or air gap.

Where a single *parcel or real property* is served by more than one *service connection*, the *backflow preventers* providing *premise isolation* installed on each *water service connection* shall all be of the same type.

**4.3. Fire Service Isolation**

*Backflow preventer(s)* shall be installed to provide *isolation* on each *fire service pipe* supplying *water* to a *real property*. One backflow preventer providing premise isolation is allowed for each service connection, but parallel installation intended to provide continuous water supply during repair or replacement of backflow preventer is also allowed.

The location of backflow preventer(s) providing fire service isolation may be located immediately within the property line of a parcel or within a building before any branching off.

*Backflow* preventer(s) for fire service isolation shall be selected in accordance with Appendix II. A detector-type backflow prevention assembly shall be required when no other water meter exists.

#### **4.4. Area Isolation**

Area isolation is intended to provide isolation for a section of piping system with potable and non-potable connections downstream of a backflow preventer.

Backflow preventers for area isolation shall be installed to:

- provide an alternative to premise isolation when there are minor upgrades, improvements, or replacement works of the water distribution system inside the premise, as determined by the General Manager, Engineering;
- allow the use of non-testable backflow prevention devices in point of use cross connections of moderate hazard as indicated in Appendix IV; or
- provide additional protection from multiple cross connections from a building or unit where higher degree of hazard than that provided by premise isolation.

Piping systems downstream of a *backflow preventer* providing *area isolation* shall not be interconnected with any water piping upstream of the backflow preventer providing area isolation.

*Backflow preventer(s)* providing *area isolation* shall be selected in accordance with Appendix 1.

#### **4.5. Zone Isolation**

Zone isolation is intended to provide protection for sections of piping system with no potable connections downstream of a zone isolation backflow preventer.

Backflow preventers for zone isolation should be installed to allow the use of non-testable backflow preventers for downstream point of use cross connections of severe hazard as indicated in Appendix IV.

Non-potable water connections supplied by a *water* piping system downstream of a *registered air gap* or RP providing *zone isolation* may not require point of use *isolation*.

Piping systems downstream of a *backflow preventer* providing *zone isolation* shall not be interconnected with any water piping upstream of the backflow preventer providing zone isolation.

All above ground piping downstream of a *backflow preventer* providing *zone isolation* shall be clearly identified, as required by CGSB Standard Can/CGSB-24.3. Label shall include in the legend wording identifying the usage of the *water* conveyed (e.g., "Non-portable WATER").

Permanent and plainly readable signs shall be applied to the outlets from a *zone isolation* piping system. The signs shall be constructed in such a fashion as to be waterproof and at least 100mm x 100mm (4 inches x 4 inches) in size.

#### **4.6. Group Isolation**

Group isolation is intended to provide isolation of a number of cross connections by a single backflow preventer subject to the following conditions:

- all cross *connections* have the exact same *hazard type*;
- all piping downstream of the *backflow preventer* is exposed or accessible for inspection; and
- all appliances, appurtenances, equipment, or plumbing fixtures are located adjacent each other and in the same room, or if outside a *building* area.

*Backflow preventer(s)* providing group *isolation* shall be selected in accordance with Appendix III.

#### **4.7. Point of Use Isolation**

*Point of use isolation* shall be required for every *cross connection* by *backflow preventers* permanently installed in a fixed location on each *connection* as close as possible to the appliance, appurtenance, equipment, fixture, hose connection, irrigation system, reservoir, vessel, or *water* discharge point.

The degree of hazard of the cross connection and the selection of backflow preventer for point of use isolation shall be determined in accordance with Appendix III and Appendix IV. If it is not listed, CSA standard should be referenced; if needed, the *General Manager, Engineering* shall determine the *degree of hazard* for any *real property* type not listed in Appendix IV.

#### **4.8. Backflow Prevention – Specific Hazard Types**

##### **4.8.1. Equipment Containing Chemical Feeding System**

Backflow preventers integral with equipment may be acceptable if manufacturer's documentation, such as shop drawings, clearly demonstrates that the backflow preventer meets the requirements of this Standard.

##### **4.8.2. Carbonators**

Carbon dioxide injection or carbonators, such as post mix soft drink equipment, shall be *isolated* by a RP. All surfaces of pipe, fittings, and equipment downstream of the RP that may come in contact with *water* injected with carbon dioxide shall be constructed of materials that do not contain copper or copper alloy.

**4.8.3. Auxiliary Water Supply**

No interconnection between an auxiliary water supply and the water distribution system is allowed. When City water is used as make-up water for an auxiliary water system, a registered air gap is required.

Outlets and piping of an auxiliary water system shall be labeled in conformance with the CAN/CSA B128.1-06 Standard.

**4.8.4 Heat Exchangers**

The selection of heat exchangers and the backflow preventer required to isolate the make-up potable water shall be based on Table 4.8.4A and Table 4.8.4 B.

**Table 4.8.4 A  
Heat Exchanger - Transfer Medium Type**

<b>Transfer Medium Description</b>	<b>Transfer Medium Hazard Type</b>
Water with no chemical additives and in contact with only potable piping system materials Common Flue Gas	Type 1
Water with no chemical additives, may be in contact with other than potable piping system materials Non-Treated Steam	Type 2
Refrigerants Treated steam Gasses (other than air) Water containing additives (regardless of toxicity) Fluids other than <i>potable water</i>	Type 3

**Table 4.8.4 B  
Heat Exchanger - Determining the *Backflow Preventer***

<b>Transfer Medium Hazard Type</b>	<b>Type of Facility</b>	<b>Type of Heat Exchanger</b>	<b>Minimum <i>Backflow Preventer</i> to Protect Cold Water Supply from <i>Heat Exchanger</i></b>
Type 1	<i>SFD</i>	SW/DW	DCAP
Type 1	<i>MFR</i>	SW/DW	DCVA
Type 1	<i>ICI</i>	SW/DW	DCVA
Type 2	<i>SFD/MFR</i>	SW/DW	DCVA
Type 2	<i>ICI</i>	SW/DW	DCVA
Type 3	<i>All facilities</i>	DW	RP

#### **4.8.5 Chemical Feeding Systems and Upstream/Downstream Pipework**

Chemical feeding systems containing chemicals that may react with copper or copper alloy, or other pipe materials, shall either require a registered air gap or an RP constructed of corrosive resistant material. Piping downstream of the RP shall require corrosive resistant material.

### **5. INSTALLATION OF BACKFLOW PREVENTERS**

#### **5.1 Installation**

Backflow Preventers shall be installed by qualified personnel in conformance with the CAN/CSA B64.10, or current version as mandated in the BC Building Code and this Standard.

Backflow Preventers shall be installed in the orientation approved by the Canadian Standards Association or certification body recognized by the Standards Council of Canada. Reduced pressure principle *backflow prevention assemblies* (RP and RPDA) must be installed in an area not subject to flooding.

The installer of a *backflow preventer*, if not the same individual as the Certified Tester, shall attach a tag to the *backflow prevention device* indicating the *hazard type* of the piping system, appliance, appurtenance, equipment, or fixture it *isolates*.

Underground installation shall only be applicable for DCVA's and the following additional conditions apply:

- DCVA's of a size of 50mm and smaller when installed in underground chamber shall be installed at a depth of no less than 600mm.
- Underground chambers must be selected to provide adequate space for removal and testing of all equipment. Access lids, latches, and ladders must comply with the current requirements of the Workers Compensation Board and provide adequate space for testing and removal of backflow preventers. The chamber (above or below ground) shall be designed to prevent the backflow device and exposed piping within the chamber from freezing.
- Thrust beams must be designed for all chambers to ensure that the force caused by a closed valve is transferred to the full width of the chamber. The Consumer's Engineer shall ensure that the chamber manufacturer is in agreement with the thrust bearing area on the chamber.
- All chambers shall be equipped with a sump and drained by either a gravity connection to the storm sewer or by an electric sump pump.

*Testable backflow prevention devices* or *registered air gaps* located higher than 1500mm above the floor or grade shall be provided with an accessible, permanent platform to allow for regular inspection, testing, and repair.



Backflow preventers shall be installed with sufficient clearance as recommended by manufacturer and as specified in Table 5.1, wherever the greater.

**Table 5.1  
Clearance for Backflow Preventer**

BP Type	Minimum distance						
	Assembly centre line height above floor		Above top of Backflow Preventer	Front of Backflow Preventer	Rear of Backflow Preventer	Flood level rim / relief valve / air inlet port above floor	Critical level above flood level rim
	Min	Max					
RAG AG	-	1500 mm*	-	750 mm*	-	300 mm	-
RPBA RPDA	750 mm	1500 mm	300 mm	750 mm	20 mm	300 mm	-
DCVA DCDA	750 mm	1500 mm	300 mm	750 mm	20 mm	-	-
PVBA	-	1500 mm	300 mm	750 mm	20 mm	300 mm	300 mm
DCAP	-	-	20 mm	1	20 mm	300 mm	
DuCV	-	-	20 mm	1	20 mm	300 mm	
AVB	-	-	300 mm	1	20 mm	300 mm	2
LFVB	-	-	300 mm	1	20 mm	300 mm	2
HCVB	-	-	-	1	20 mm	300 mm	2

\* Registered air gap only  
 1 – must be accessible for replacement  
 2 – 2 x manufacturer’s recommended distance

AVB, LFVB, HCVB, and HCDVB shall not be installed where there is continuous pressure (more than 12 hours in 24-hour period) and no control valve exist downstream of device.

All piping downstream of HCDVB shall not be higher than 3m of the above backflow preventer.

Where the temporary discontinuance of *water* to a *connection* would cause extreme hardship or danger to a *consumer* or the general public, the *connection* shall be *isolated* by the installation of two or more *backflow preventers* installed in parallel.

In addition to CAN/CSA-B64.10-01, Clause 5.7, the two or more *backflow preventers* installed in parallel shall be of identical make and model and have a minimum combined capacity to maintain the required maximum flow rate demand of the downstream *water service pipe*, piping system, or *connection*.

**5.2. Appurtenance****5.2.1 Shut Off Valves**

Shutoff valves as a component of a *backflow prevention assembly* shall only be used for their intended purpose of testing and repair of the testable *backflow prevention device*. A separate valve, other than those supplied as part of a *backflow preventer*, shall be supplied for the purpose of stopping or restricting flow to a *parcel*, facility, *building*, piping system, appliance, appurtenance, equipment, fixture, hose connection, hydrant, reservoir, system vessel, or *water* discharge point.

**5.2.2. Test Cocks**

Test cocks on *backflow preventers* shall be manual type test cocks, as supplied by the manufacturer. Test cocks of *backflow preventers* installed below grade shall be sealed watertight with plugs or caps constructed of potable materials. Plugs or caps sealing test cocks shall be removed for field testing and/or repairing purposes and shall be reinstalled upon completion of the field test.

**5.2.3. Strainers**

Strainer(s) shall be provided and located so that any *water* that passes through a *backflow preventer* providing *premise isolation* shall have first passed through a strainer.

No strainer should be installed on piping that supplies any fire systems including, but not limited to, a fire sprinkler system and a fire hydrant.

Adequate signage shall be provided to aid in the location of *backflow preventers* installed in concealed areas (e.g., behind access panels, or within cupboards and crawlspaces).

**5.2.4. Backflow Preventer Relief and Vent Port Spacing and Air Gap**

An *air gap* shall be provided to *isolate* a drainage piping system from the relief port(s) of a RP or RPDA and the vent or port of a DCAP and a DCAPC. This *air gap* shall be located immediately below the relief port.

Adequate spacing shall be provided at the relief port of a RPBA and RPDA for testing, maintenance, and operational requirements. The inlet of a pipe serving the relief port shall be free of burrs and sharp edges.

*Backflow preventer* relief port and vent port drain piping shall be sized and configured to adequately conduct the full flow possible from the relief port for extended periods of time and without spillage to a location acceptable to the *City*.

Where a *backflow prevention* requires that a relief port be accessed for reasons due to maintenance and/or repair, any portion of piping receiving the relief port discharge that impairs access shall be removable by the use of mechanical joints.

### **5.2.5 Protection Against the Effect of Water Hammer**

*Backflow preventers* shall be protected from the effects of water hammer by the installation of one or more water hammer arrestors in locations as determined by the Designer of the Plumbing System retained by the Consumer.

## **6. REPLACEMENT, REPAIR, REMOVAL, RE-USE, AND IDENTIFICATION OF BACKFLOW PREVENTERS**

### **6.1. Replacement**

Internal parts replaced on a *backflow preventer* shall be the manufacturer's approved new replacement part. Every test cock replaced on a testable *backflow prevention device* shall be the manufacturer's approved replacement test cock.

Replacement of shutoff valves of a testable *backflow prevention device* shall comply with the requirements of the testable *backflow prevention device* manufacturer.

The installer or designer shall make sure that adequate flow and pressure to piping downstream of the *backflow preventer* is maintained.

### **6.2. Repairs**

Repairs conducted on *backflow preventers* shall conform to the manufacturer's specifications.

### **6.3. Removal**

A *backflow preventer* shall not be removed while the *cross connection(s)* still exists and remains a *threat*, unless a *replacement backflow preventer is installed*.

The *consumer* shall complete a "Removed Backflow Preventer Verification Form" issued by the *City*. The completed and signed form shall be submitted to the City's Engineering Department upon completion of the work performed to remove the *backflow preventer*.

**6.4 Re-Use**

A *backflow preventers* that has been removed as a result of failure where a backflow incident has occurred shall not be reinstalled or used as a portable *backflow preventer* under any circumstances.

**6.5 Identification**

The Consumer shall maintain the identification plate or marking in a clear and legible manner. In the event that the identification plate or marking of a *testable backflow prevention device* is missing or can no longer be read, the *consumer* shall either:

- (a) get a new plate from the backflow prevention device manufacturer;
- (b) replace the testable backflow prevention device in accordance with this By-law;  
or
- (c) upon the acceptance of the General Manager, Engineering, attach an *acceptable* identification plate or tag to the testable backflow prevention device in accordance with the *Standard*.

In the case of (c), the *consumer* shall apply in writing to the *General Manager, Engineering* for permission to attach the identification plate and shall supply all information that the *General Manager, Engineering* requires concerning the *backflow prevention assembly*.

**7. TESTABLE BACKFLOW PREVENTION DEVICE TESTING/REGISTERED AIR GAP INSPECTION****7.1. Annual Test Dates****7.1.1. Setting of Annual Test Dates**

The initial test date of new testable *backflow prevention device* upon installation is generally taken as the Annual Test Date except devices for irrigation operation.

The *General Manager, Engineering* shall assign a date upon or about which a testable *backflow prevention device* shall be field tested or a *registered air gap* shall be inspected:

- If the previous annual test date is no longer applicable or not known;
- more frequent periodic testing is required; or
- to adjust for irrigation operation.

**7.1.2. Change Requested by Consumer**

The *consumer* may apply to the *General Manager, Engineering* in writing for a change to the annual test date of backflow preventer(s) to consolidate the same test date for multiple backflow preventers and/or to coincide with maintenance activities in the same facility.

The change of Annual Test Date, once accepted by the City, will become permanent, and shall not be reverted back to the previous Annual Test Date.

The request to change the Annual Test Date would only be considered by the City if the proposed date is earlier than the current Annual Test Date.

The Annual Test Date will remain unchanged if the testable *backflow prevention device* is tested late.

**7.1.3 Acceptance of Test Conducted Early**

A test conducted before the Annual Test Date may be accepted by the City if the test date is within two months of the Annual Test Date.

Any test conducted more than two months prior to the Annual Test Date is not acceptable as the annual test. The testable *backflow prevention device* shall be required to be re-tested on the Annual Test Date. The *General Manager, Engineering* may accept such test if the *consumer* applies for a change of the Annual Test Date, as set out in this Standard.

**7.1.4 Irrigation**

All existing testable *backflow prevention devices* providing isolation for an irrigation system shall be tested between March 1 and June 30 of each year. The Annual Test Date of any new devices or existing devices which a date change is requested shall be set between May 1 and May 31, prior to the beginning of lawn sprinkling season.

A testable *backflow prevention device* used as *point of use* or *group isolation* for a seasonally pressurized *connection* or *connections* shall be field tested immediately upon the first seasonal pressurization of the *connection* or *connections*.

**7.2. Certified Testers**

The Certified Tester shall present to the *City* all documentation related to the Certified Tester's certification of competency upon request of the *General Manager, Engineering*.

The Certified Tester shall have available, at the time of a field test, all tools and equipment necessary to access, identify, field test, and troubleshoot the testable *backflow prevention device* in a safe and professional manner.

### **7.3. Test Procedures and Inspection Requirements**

The minimum *acceptable* field test performance requirements of a testable *backflow prevention device* shall be as determined in the CAN/CSA-B64.10.1-07, or current version, "Selection and installation of backflow preventers/Maintenance and field testing of backflow preventers", or the current BCWWA Testing Procedures.

The field test of a testable *backflow prevention device* shall include an inspection of the exterior of the testable *backflow prevention device* and the area immediately surrounding the testable *backflow prevention device* to:

- (a) identify and record the identification data of the testable *backflow prevention device*; and
- (b) identify the *cross connection (hazard type)* being *isolated*.

The registered air gap shall be inspected to confirm its conformance with this Standard.

### **7.4. Field Test Equipment**

#### **7.4.1. Sight Tubes**

Field tests using sight tubes with a minimum length of 765 mm (30 inches) may be conducted only on DCVA and DCDA type devices installed in a horizontal position.

#### **7.4.2. Differential Pressure Gauge**

Testing equipment used to conduct tests of testable *backflow prevention devices* shall include a differential pressure gauge of the three or five valve configuration analogue type. When necessary, the use of a water tube and bleed-off valve arrangement, as described in the *test procedures*, shall be used in conjunction with field testing of DCVA, DCDA, and PVB type devices.

The differential pressure gauge shall legibly bear the:

- (a) name and/or trademark of the manufacturer;
- (b) model number; and
- (c) serial number provided by the factory or identification number provided by the calibration agency.

The differential pressure gauge should legibly bear the:

- (a) high, low, and bypass control valve indicators;
- (b) maximum rated working pressure; and
- (c) maximum rated working water temperature.

The differential pressure gauge shall have a range of 0 to 15 PSID (0 to 104 kPaD) and graduated to increments of 0.2 PSID (1.4 kPaD). The face of the differential pressure gauge shall have a diameter not less than 75 mm (3 inches). The manufacturer's accuracy rating of the differential pressure gauge shall have a maximum variance of +/- 3.0% of full scale descending.

### **7.4.3 Differential Pressure Gauge - Calibration**

The differential pressure gauge found to have over a 0.3 PSID (2 kPaD) variance from actual pressure differential at any point across its range of measurement shall not be used to field test a testable *backflow prevention device* until it has been repaired and recalibrated in accordance with this Standard.

The accuracy of the differential pressure gauge shall be verified in a manner employing good engineering practice to meet the manufacturer's specifications measured against a reference standard traceable to the National Institute of Standards and Technology or other *acceptable* national standard.

All accuracy verification, calibration, and repairs performed on a differential pressure gauge shall be performed and documented by:

- (a) a person holding a British Columbia or Interprovincial ticket of qualification as an industrial instrument mechanic;
- (b) an indentured apprentice industrial instrument mechanic working under the direct supervision of a person as described in (a);
- (c) a person having similar recognized qualification as described in (a) obtained in a different province or foreign country;
- (d) a professional engineer of the appropriate discipline; or
- (e) a person having proven competency as an avionics technician or having received extensive formal training in instrumentation repair and calibration and shall be an employee of an instrument calibration company recognized by the *General Manager, Engineering*, the manufacturer differential pressure gauge, or other *acceptable* organization.

A differential pressure gauge shall be calibrated or its accuracy verified annually, and within one year previous of a field test of a testable *backflow prevention device* and immediately when the indicating needle seizes or behaves in an erratic manner or it is known or suspected that the accuracy of a differential pressure gauge is no longer within the tolerances as required by Clause 7.4.2.

#### **7.4.4. Field Test Equipment Documentation**

The Certified Tester shall keep records of all documentation pertaining to a differential pressure gauge used to conduct testable *backflow prevention device* field tests. This documentation shall include the accuracy verification, calibration, and/or repair information reports issued by the instrumentation company or organization performing the accuracy verification, calibration, and/or repairs to the differential pressure gauge.

Documentation shall include but may not be limited to the:

- (a) name, address, and phone number of the instrumentation company that performed the accuracy verification, calibration, and/or repair information reports;
- (b) differential pressure gauge type, manufacturer, model, and serial number;
- (c) verification method and equipment (including applicable traceability to a national standard) utilized to perform the accuracy verification or calibration and its date;
- (d) before and after calibration/accuracy verification of applied pressure and gauge readings to within one-tenth (0.1) of a PSID observed by the instrumentation technician; and
- (e) signature of the instrument technician who performed the accuracy verification or calibration or that of the instrumentation company's or organization's authorized representative.

Upon request by the *City*, the Certified Tester or the owner of the test equipment shall supply to the *General Manager, Engineering* with photocopies or a faxed transmission of all documentation requested relating to the field test equipment used.

Additional documentation shall include but may not be limited to the:

- (a) business name of the owner of the test equipment; and
- (b) full name, certification number, and certification organization of the Certified Tester(s) using the equipment.



**7.4.5. Water Distribution System – Line Pressure**

Line pressure shall be measured using a pressure gauge with a range of either 0 to 160 PSI (0 to 1100 kPa) or 0 to 200 PSI (0 to 1379 kPa).

**7.5. Field Test and Inspection Reporting****7.5.1. Test Report Form**

The Certified Tester shall either complete the test report online (<http://www.surrey.ca/city-services/13764.aspx>) or legibly complete in full, sign, and submit to the *City* a *test report form* for each field test conducted on a testable *backflow prevention device* and each inspection of a *registered air gap*. Mandatory online submission of test report for all existing testable backflow prevention devices is effective after September 1, 2014. Test reports for new devices will be submitted in paper test report form, *which* can be picked up at the Engineering Front Counter in City Hall. It shall be completed immediately following and at the same location of the field test.

If the testable *backflow prevention device* fails an initial field test but is immediately repaired and retested so that it passes the field test after repair, both tests may be reported on a single *test report form*. Initial field tests shall be recorded in the initial test portion of the *test report form*. The field test that is required following a cleaning or repair shall be recorded in the test after repair portion of the form.

Test results of pressure values observed from the differential pressure gauge shall be recorded on a *test report form* to the first decimal point (1/10) of a PSID or PSIG.

*Test report forms* shall be completed using indelible ink.

Corrective fluids or tapes shall not be used on *test report forms*. Where a correction is necessary, the Certified Tester shall strike through any misinformation and initial the correction.

Where identification data is not obtainable from a *backflow preventer*, the Certified Tester shall record in the appropriate space provided on the *test report form*:

- (a) “unreadable” where the data cannot be read due to damage, corrosion, marked over, or similar circumstances; or
- (b) “tag missing” where the identification plate has been removed.

Where mandatory data is unobtainable, the Certified Tester shall include a brief description explaining why the information is not recorded in the remarks section on back of the *test report form*.

**7.5.2. Detector Type Backflow Preventer**

The *mainline testable backflow prevention device* and the bypass line testable *backflow prevention device*, as parts of either a DCDA or RPDA, are each determined as a separate testable *backflow prevention device* and the field test on each shall be recorded on a separate *test report form*.

**7.5.3. Reporting Passing Field Test or Inspection**

When a registered air gap passes inspection or a testable *backflow prevention device* passes a field test or fails an initial test but is immediately repaired and retested so that it passes the test after repair, the Certified Tester shall fill out completely the tear-off tag portion of the *test report form* and sign it indicating the registered air gap and testable *backflow prevention device* meets the performance requirements as accepted by the *City*. The tear-off tag must then be attached by the use of a nylon cable strap or other reliable means to the testable *backflow prevention device*, or affixed in a conspicuous location in the immediate vicinity of the registered air gap.

The Certified Tester shall submit the completed and signed Testable *Backflow Prevention Device* Test Report indicating a successful test to the *City's* Engineering Department.

**7.5.4. Reporting Failing Field Test / Inspection or Unable to Field Test**

The Certified Tester shall provide notice to the *City's* Engineering Department within three business days if:

- (a) *testable backflow prevention device* cannot be field tested due to a fault of the *testable backflow prevention device* (e.g., a failing condition or damaged/missing parts) or fails an initial field test and is not immediately repaired and retested so that it passes the test after repair; or
- (b) *registered air gap* fails inspection and is not immediately corrected.

The notice should be by the submission of the original, faxed, or a photocopy of a completed and signed *test report form* indicating an unsuccessful attempt to field test or failed field test or inspection. The Certified Tester shall not complete, sign, or detach the tear-off tag portion of the *test report form*.

**7.5.5. Reporting Repair / Replacement**

The *Certified Tester* shall include a description of all cleaning/repair information, including all parts replaced (whether internal or external) on the *test report form* used to report the field test following the repair or cleaning. Repair data shall be recorded on the back of the form.

In the event a testable *backflow prevention device* is replaced, the Certified Tester shall record the serial number of the testable *backflow prevention device* that was removed in the appropriate space provided on the *test report form*. In addition, the Certified Tester shall include in the form's remarks section the reason(s) why the replacement was necessary.

## Appendix I

### Guideline for the Selection of Backflow Preventer for Premise or Area Isolation

Real Property or Facility Type	Degree of Hazard	Type of Backflow Preventer	Premise Isolation by DCVA may be considered if the facility is Area Isolated by RP
Abattoir / Rendering Plant / Slaughter House	Severe	RP	
Animal Feed Lot	Severe	RP	
Animal Stock Yard	Severe	RP	
Apartment Building	Moderate	DCVA	
Aquaculture Farm	Severe	RP	
Aquarium (Public)	Severe	RP	yes
Arena	Moderate	DCVA	
Asphalt Plant	Severe	RP	
Auto Body Shop	Severe	RP	yes
Auto Dealership	Moderate	DCVA	
Auto Dealership w/Repair and/or Car Wash Facility	Severe	RP	yes
Auto Detailing Facility (Not Automatic Car Wash)	Moderate	DCVA	
Auto / Truck Rental Facility	Moderate	DCVA	
Automotive / Motorcycle Repair Facility	Severe	RP	yes
Auto Wrecking Facility	Severe	RP	
Battery Manufacturing / Repair	Severe	RP	yes
Beverage Processing/Bottling Facility Including Distillery & Brewery	Severe	RP	yes
Blood Clinic	Severe	RP	yes
Campground	Moderate	DCVA	
Campground With RV Sanitary Dump Station	Severe	RP	yes
Car Wash (Automatic)	Severe	RP	yes
Cemetery (No Funeral Home or Morgue)	Moderate	DCVA	
Cemetery (with Funeral Home or Morgue)	Severe	RP	yes
Chemical Industry (Manufacturing, Processing, Bulk Storage and/or Distribution)	Severe	RP	
Church/Temple	Moderate	DCVA	
Civil Works Facility	Severe	RP	
Cold Storage Facility	Severe	RP	
College/University/ Technical Institute - With no severe hazard facility portion(s)	Moderate	DCVA	
College/University/ Technical Institute - With severe hazard facility portion(s)	Severe	RP	yes
Commercial premises with no severe hazard	Moderate	DCVA	
Commercial premises with severe hazard	Severe	RP	yes
Commercial Coin Operated Laundry	Moderate	DCVA	
Commercial Laundries (other than Coin-Operated Laundromats)	Severe	RP	yes
Concrete Processing or Distribution Facility	Severe	RP	
Construction Site	Moderate	DCVA	
Construction Site – Development Designated as Severe hazard	Severe	RP	

Real Property or Facility Type	Degree of Hazard	Type of Backflow Preventer	Premise Isolation by DCVA may be considered if the facility is Area Isolated by RP
Convenience / Corner Store	Moderate	DCVA	
Dairy	Severe	RP	
Dental Clinic/Office/ Surgery	Severe	RP	yes
Dental Office	Moderate	DCVA	
Docks - Commercial	Severe	RP	
Duplex Housing	Minor	DuC	
Dry Cleaning	Severe	RP	yes
Dye Plant	Severe	RP	
Esthetical Clinic	Moderate	DCVA	
Exhibition Ground / Caravel / Circus	Severe	RP	yes
Extended Care Facility / Retirement Home / Nursing Home - With no severe hazard diagnostic or treatment equipment	Moderate	DCVA	
Extended Care Facility / Retirement Home / Nursing Home - With severe hazard diagnostic or treatment equipment	Severe	RP	yes
Film Processing	Severe	RP	yes
Fire Hall	Moderate	DCVA	
Fish Hatchery	Severe	RP	
Fish Processing Plant	Severe	RP	yes
Food Processing Plant	Severe	RP	yes
Fuel Dispensing Facility (Common Gas station)	Moderate	DCVA	
Funeral Home	Severe	RP	yes
Garbage Transfer Facility	Severe	RP	
Golf Course	Severe	RP	
Greenhouse / Nursery - ICI	Severe	RP	
Grocery Store	Moderate	DCVA	
Hair Salon	Moderate	DCVA	
Heavy Equipment Dealer / Rental	Moderate	DCVA	
Heavy Equipment Dealer / Rental / Repair	Severe	RP	yes
Hospital – All	Severe	RP	
Hospital (active treatment area)	Severe	RP	
Hospital (non-treatment area)	Moderate	DCVA	
Ice Manufacturing Plant	Severe	RP	
Hotel	Moderate	DCVA	
Industrial Zoned Parcel	Severe	RP	
Institutional Facility - With no severe hazard facility portion(s)	Moderate	DCVA	
Institutional Facility - With severe hazard facility portion(s)	Severe	RP	yes
Kennel (Commercial)	Moderate	DCVA	
Laboratory	Severe	RP	yes
Lens Manufacturing Facility	Severe	RP	yes
Machine Shop	Severe	RP	
Manufacturing Facility	Severe	RP	
Meat Packing Plant	Severe	RP	yes

Real Property or Facility Type	Degree of Hazard	Type of Backflow Preventer	Premise Isolation by DCVA may be considered if the facility is Area Isolated by RP
Medical Clinic w/o Surgical and/or Radiology Equip	Moderate	DCVA	
Medical Clinic w/Surgical and/or Radiology Equip	Severe	RP	yes
Metal Plating Facility	Severe	RP	
Milk Processing Facility	Severe	RP	
Mining including gravel extraction	Severe	RP	
Mobile Home Park	Moderate	DCVA	
Mortuary, Morgue	Severe	RP	yes
Motel	Moderate	DCVA	
Motion Picture Studio	Severe	RP	
Multi-family residential	Moderate	DCVA	
Multiple Service Facilities - residential, commercial or institutional	Moderate	DCVA	
Neighbourhood Pub	Moderate	DCVA	
Nightclub / Cabaret	Moderate	DCVA	
Nursery - Commercial	Severe	RP	yes
Office Building	Moderate	DCVA	
Oil / Petroleum Refinery	Severe	RP	
Paint Manufacturing Plant	Severe	RP	yes
Penitentiary – Restricted Access	Moderate	DCVA	
Pet Retail & Services	Moderate	DCVA	
Petroleum Processing / Bulk Storage and/or Distribution Facility	Severe	RP	
Pharmaceutical Manufacturing Facility	Severe	RP	
Photo Processing Facility	Severe	RP	yes
Plastic Manufacturing / Mould Injection Facility	Severe	RP	
Plating Shop	Severe	RP	yes
Pleasure Boat Marina / Rental with no sanitary dump station	Moderate	DCVA	
Pleasure Boat Marina / Rental	Severe	RP	yes
Pleasure Boat Manufacturing and/or Repair Facility	Severe	RP	
Poultry Farm	Severe	RP	
Power Generating Station	Severe	RP	
Power Generating Station - no fossil fuel or chemicals	Minor	DuC	
Printing Facility	Severe	RP	yes
Public Park	Moderate	DCVA	
Pulp and/or Paper Mill	Severe	RP	
Radiator Manufacturing and/or Repair Facility	Severe	RP	
Radioactive Material Processing / Handling Facility	Severe	RP	
Rail Yards & Trackside Facilities for Trains	Severe	RP	
Real Property Located in ALR - SFD without other hazard, and no connection with auxillary water supply	Minor	DuC	
Real Property Located in ALR with agricultural and other use	Severe	RP	
Real Property, except SFD, with auxillary water supply	Severe	RP	

Real Property or Facility Type	Degree of Hazard	Type of Backflow Preventer	Premise Isolation by DCVA may be considered if the facility is Area Isolated by RP
Real Property with Multiple Water Service Connections - Designated Minor or Moderate hazard	Moderate	DCVA	
Real Property other than SFD with access to Auxiliary Water Supply	Severe	RP	
Recreation Centre – w/o Ice Rink	Moderate	DCVA	
Recreation Centre - with Ice Rink	Severe	RP	yes
Recreational Vehicle Park w/o Sanitary Dump Station	Moderate	DCVA	
Recreational Vehicle Park With Sanitary Dump Station	Severe	RP	
Recycling Facility	Severe	RP	
Rendering Facility	Severe	RP	
Research Facility	Severe	RP	yes
Residential w/ Multiple Commercial Severe Hazards on Premises – SFD / MFR	Severe	RP	yes
Restaurant	Moderate	DCVA	
Restricted Access	Severe	RP	
Salvage Yard / Scrap Dealer	Severe	RP	
School – w/o any Severe Hazard Portion	Moderate	DCVA	
School – With Laboratory or other Severe Hazard Portion	Severe	RP	yes
Sewage Dump Station	Severe	RP	
Sewage / Storm or Wastewater Pumping Station	Severe	RP	
Sewage / Wastewater Treatment Plant	Severe	RP	
Single Family Dwelling	Minor	DuC	
Shipyards	Severe	RP	
Shopping Center / Mall	Moderate	DCVA	
Steam Plant	Severe	RP	
Steel Manufacturing Facility	Severe	RP	
Swimming pool facility	Moderate	DCVA	
Tall Building (>=> 10 Meters above service connection entry)	Moderate	DCVA	
Tanning Salon	Moderate	DCVA	
Theatre	Moderate	DCVA	
Tool / Equipment Rental and/or Repair Facility	Severe	RP	
Townhouse or Strata with detached homes with no moderate or severe hazard	Minor	DuC	
Trackside Facilities for Trains	Severe	RP	
Veterinary Clinic - With Minimal Severe Hazard Equipment	Moderate	DCVA	
Veterinary Clinic / Animal Hospital - With Laboratory or Operation Facility	Severe	RP	yes
Waste Disposal Facility	Severe	RP	
Wastewater facility	Severe	RP	
Water Park with no water treatment facilities	Moderate	DCVA	
Water Park with water treatment facilities	Severe	RP	yes
Water Treatment / Dispensing Facility (ICI)	Severe	RP	

Real Property or Facility Type	Degree of Hazard	Type of Backflow Preventer	Premise Isolation by DCVA may be considered if the facility is Area Isolated by RP
Water Treatment Facility	Severe	RP	yes
Warehouse / Dry Goods Storage Facility	Moderate	DCVA	
Zoo / Game Farm	Severe	RP	yes



## Appendix II

### Guideline for the Selection of Backflow Preventer for Fire Service Isolation

Fire Protection System Type (Classification and definition of fire sprinkler/standpipe systems are the same as Plumbing Code)	Required <i>Backflow Preventer(s)</i> without Antifreeze or Other Additives		Required Backflow Preventer(s) System w/Antifreeze or Other Additives
Residential full flow through fire sprinkler/standpipe system constructed of potable water system materials (will be considered only for single family dwelling under exceptional circumstances)	No testable <i>backflow preventer</i> required		N/A
Residential partial flow through fire sprinkler/standpipe system constructed of potable water system materials (will be considered only for single family dwelling under exceptional circumstances)	DuCF for pipe size 32mm or below, DCVA for 40mm and above.		N/A
Class 1 fire sprinkler/standpipe system	combined water service pipe	DCVA	RP on each <i>connection</i> to chemical portion of system and DCVA on the balance of the fire protection system
	fire service pipe	DCDA	RPBA
Class 2 fire sprinkler/standpipe system	combined water service pipe	DCVA	RP on each <i>connection</i> to chemical portion of system and DCVA on the balance of the fire protection system
	fire service pipe	DCDA	RP
Class 3 fire sprinkler/standpipe system w/reservoir and system's water kept in potable condition	combined water service pipe	DCVA	RP on each <i>connection</i> to chemical portion of system and DCVA on the balance of the fire protection system
	fire service pipe	DCDA	RP
Class 3 fire sprinkler/standpipe system w/reservoir water not kept in potable condition	combined water service pipe	RP	RP on each <i>connection</i> to chemical portion of system and DCVA on the balance of the fire protection system
	fire service pipe	RPDA	RP
Class 4 fire sprinkler/standpipe system		RPDA	RPDA
Class 5 fire sprinkler/standpipe system		RPDA	RPDA
Class 6 fire sprinkler/standpipe system (not allowed in new construction or renovation)		RPDA	RPDA
Private Fire Hydrant		DCDA	N/A
Any fire protection system within a <i>Restricted Access Parcel</i> or <i>Real Property</i>	backflow preventer selected in accordance to the classification and installed at property line		

## Appendix III

### Guideline for the Selection of Backflow Preventer for Point of Use Isolation

Point of Use Cross Connection	Proposed Degree of Hazard	Proposed Backflow Preventer	
		Backpressure & Backsiphonage	Backsiphonage Only
Acid wash or hot tank	Severe	RP	PVB
Agricultural chemical sprayer - <i>ICI</i>	Severe	RP	PVB
Air compressor commercial/industrial, no chemical added	Moderate	DCVA	N/A
Air compressor oil cooler - see <i>heat exchanger</i> & temperature above 60° C	Moderate	DCVA	N/A
Air compressor oil cooler - see <i>heat exchanger</i> & temperature above 60° C	Severe	RP	N/A
Air conditioning systems - no chemical added	Moderate	DCVA	N/A
Air conditioning systems	Severe	RP	N/A
Air washer	Severe	RP	N/A
Animal cage washer	Severe	RP	PVB
Animal wash	Severe	RP	PVB
Animal watering	Severe	RP	PVB
Aquarium make up	Severe	RP	PVB
Aspirator – <i>MFR / ICI</i>	Severe	RP	PVB
Aspirator - <i>SFD</i>	Minor	DuC or HCDVB	HCVB
Aspirator - Vault drain	Severe	RP	PVB
Autoclave	Severe	RP	N/A
Autopsy/mortuary equipment	Severe	RP	PVB
Auxiliary water	Severe	AG	AG
Baptismal fountain	Moderate	DCVA	AVB
Bathtub deck mount faucet w/flex hose <i>SFD / MFR</i>	Minor	DuC	DuC
Battery fill <i>connection</i> - permanent or hose bibb	Severe	RP	PVB
Beverage dispenser – non carbonated	Minor	DuC	AVB
Beverage dispenser hose & head w/carbonated beverages and <i>water</i>	Severe	RP	N/A
Bidet	Severe	N/A	AVB
Boiler / steam generation w/o chemical addition	Moderate	DCVA	N/A
Boiler / steam generation with chemical addition	Severe	RP	N/A
Boosted <i>water</i> temperature above 65° C inlet to booster and <i>water</i> inlet < 13mm with chemical addition	Severe	RP	N/A
Boosted <i>water</i> temperature above 65° C inlet to booster and <i>water</i> inlet < 13mm and all <i>SFD</i> w/o chemical addition	Minor	DuC	N/A
Boosted <i>water</i> temperature above 65° C inlet to booster and <i>water</i> inlet => 13mm with chemical addition	Severe	RP	N/A
Boosted <i>water</i> temperature above 65° C inlet to booster and <i>water</i> inlet => 13mm and <i>ICI/MF</i> w/o chemical addition	Moderate	DCVA	N/A
Bottle washer	Severe	RP	N/A
Bread making equipment w/o steam	Minor	DuC	DuC
Bread making equipment with steam	Moderate	DCVA	N/A

Point of Use Cross Connection	Proposed Degree of Hazard	Proposed Backflow Preventer	
		Backpressure & Backsiphonage	Backsiphonage Only
Brewery equipment	Severe	RP	N/A
Brine tank	Moderate	DCVA	AVB
Can washer	Severe	RP	PVB
Car / Truck washing equipment	Severe	RP	N/A
CO2 injection	Severe	RP	N/A
Cart washer	Severe	RP	N/A
Chemical cleaning tank	Severe	RP	PVB
Chemical feed system, separate or integral to another equipment/appliance	Severe	RP	PVB
Chemical feed/mixing vessel	Severe	RP	PVB
Chemical holding/storage tank	Severe	RP	PVB
Chilled <i>water</i> system / chiller tank (closed, no chemical)	Moderate	DCVA	DCVA
Chilled <i>water</i> system / chiller tank (open, or with chemical)	Severe	RP	PVB
Chilled <i>water</i> system / chiller tank	Severe	RP	PVB
Chlorinator	Severe	RP	PVB
Circuit Board Washer	Severe	RP	PVB
Clothes washer – single residential type – <i>MFR</i> – Commercial	Minor	DuC	DuC
Clothes washer or laundry machines – bank of multiple machines – <i>MFR</i> – Commercial (coin operated)	Moderate	DCVA	PVB
Clothes washer and laundry machines - Industrial (other than coin-operated washer)	Severe	RP	PVB
Commercial Kitchen Equipment – Coffee brewer / urn	Minor	DuC	N/A
Commercial Kitchen Equipment – Commercial dish or ware washer	Severe	RP	PVB
Commercial Kitchen Equipment – Cooking Kettle	Minor	DuC	DuC
Commercial Kitchen Equipment – Cappuccino / Espresso Machine	Moderate	DCVA	N/A
Commercial Kitchen Equipment – Dipper well	Moderate	DCVA	AVB
Commercial Kitchen Equipment – Dish rinse unit with flexible hose	Moderate	DCVA	AVB
Commercial Kitchen Equipment – Dish/pot rinse flex hose (hose extendable to below flood level rim)	Severe	RP	PVB
Commercial Kitchen Equipment – Food steamer	Moderate	DCVA	N/A
Commercial Kitchen Equipment – Hot chocolate maker	Minor	DuC	N/A
Commercial Kitchen Equipment – Hot <i>water</i> dispenser <i>water</i>	Minor	DuC	N/A
Commercial Kitchen Equipment – Glass washer	Severe	RP	PVB
Commercial Kitchen Equipment – Ice cream / custard machine	Moderate	DCVA	AVB
Commercial Kitchen Equipment – Ice machine– <i>water</i> feed	Severe	RP	N/A
Commercial Kitchen Equipment – Ice machine– condenser cooling (exchanger not DWLP)	Severe	RP	N/A
Commercial Kitchen Equipment – Juice machine	Minor	DuC	DuC
Commercial Kitchen Equipment – Range/vent hood or canopy wash down	Severe	RP	PVB
Commercial Kitchen Equipment – Rotisserie oven	Moderate	DCVA	N/A

Point of Use Cross Connection	Proposed Degree of Hazard	Proposed Backflow Preventer	
		Backpressure & Backsiphonage	Backsiphonage Only
Commercial Kitchen Equipment – Pot washer	Severe	RP	N/A
Commercial Kitchen Equipment – Potato peeler	Moderate	DCVA	AVB
Commercial Kitchen Equipment – Steam cooker	Moderate	DCVA	N/A
Commercial Kitchen Equipment – Steam table	Moderate	DCVA	AVB
Commercial Kitchen Equipment – Steamer Oven	Moderate	DCVA	N/A
Commercial Kitchen Equipment – Tea maker <i>water</i>	Minor	DuC	N/A
Commercial Kitchen Equipment - Waste food tray line/trough	Severe	RP	PVB
Commercial Kitchen Equipment – Waste pulper	Severe	RP	PVB
Commercial Kitchen Equipment – Waste pulp press	Severe	RP	PVB
Commercial Kitchen Equipment – Wok table with submerged inlet	Moderate	DCVA	AVB
Computer cooling	Severe	RP	N/A
Concrete coring machine	Moderate	DCVA	AVB
Concrete Mixing	Severe	RP	PVB
Condensate cooling/receiver/tank	Severe	RP	N/A
Condensate tank (top feed)	Moderate	DCVA	AVB
Conveyor washer	Severe	RP	PVB
Cooling condenser, AC unit (solenoid downstream)	Severe	RP	PVB
Cooling condenser, AC unit (solenoid upstream)	Minor	DuC	DuC
Cooling tower	Severe	RP	N/A
Dairy Processing	Severe	RP	PVB
De-aerator (bottom feed)	Severe	RP	N/A
De-aerator (top feed)	Moderate	DCVA	N/A
Degreasing equipment	Severe	RP	PVB
Dental Equipment – Cuspidor	Severe	RP	PVB
Dental Equipment – <i>Water</i> supply to each dental chair	Severe	RP	PVB
Dental Equipment – Film processor	Severe	RP	PVB
Dental Equipment – Model Trimmer	Severe	RP	PVB
Dental Equipment – Sterilizer	Severe	RP	N/A
Dental Equipment – Vacuum pump	Severe	RP	PVB
Dental Equipment – X ray machine	Severe	RP	PVB
Descaling equipment	Severe	RP	PVB
Detergent/Soap dispenser	Severe	RP	PVB
Dishwasher (commercial)	Moderate	DCVA	N/A
Dishwasher ( MF - residential)	Moderate	DCVA	N/A
Dishwasher – single residential type	Minor	DuC	N/A
Disinfection Equipment – Mobile hazmat/other	Severe	RP	PVB
Distiller	Minor	DuC	DuC
Dockside <i>connection</i> to each pleasure craft and small commercial boat	Severe	RP	RP
Dockside <i>connection</i> to each large commercial vessel	Severe	RP	RP
Drinking fountain in park (human or animal)	Moderate	DCVA	DCVA
Dry cleaning equipment	Severe	RP	PVB
Dye vat	Severe	RP	PVB

Point of Use Cross Connection	Proposed Degree of Hazard	Proposed Backflow Preventer	
		Backpressure & Backsiphonage	Backsiphonage Only
Dye equipment	Severe	RP	PVB
Dynamometer	Severe	RP	PVB
Emergency eyewash/shower		Install upstream of the zone isolation	
Engine/genset cooling system	Severe	RP	N/A
Equipment wash down	Severe	RP	PVB
Etching tank	Severe	RP	PVB
Evaporative cooler / swamp cooler	Severe	RP	PVB
Fermentation tank	Severe	RP	PVB
Film processor	Severe	RP	PVB
Fire engine foam tank fill <i>connection</i> (fire hall)	Severe	RP	PVB
Fire hose cleaning equipment	Severe	RP	PVB
Fire hose cabinet (connected to domestic piping)	Moderate	DCVA	N/A
Flexible shower hose – <i>SFD</i>	Minor	DuC	DuC
Floor drain with flushing rim	Severe	RP	PVB
Flush tank – water closet	Moderate	N/A	Anti-siphon device
Flushing equipment device (not flush valve)	Severe	RP	PVB
Fossil fuel tank/equipment	Severe	RP	PVB
Fountain, ornamental (water feature), indoor	Moderate	DCVA	AVB
Fountain, ornamental (water feature), outdoor	Severe	RP	PVB
Fountain, ornamental (water feature) (chemicals added)	Severe	RP	PVB
Freeze thaw machine with antifreeze	Severe	RP	PVB
Freeze thaw machine	Moderate	DCVA	PVB
Frozen carbonated beverage maker – condenser cooling	Severe	RP	N/A
Fume hood	Severe	RP	PVB
Garbage can washer	Severe	RP	PVB
Garbage chute wash down	Severe	RP	PVB
Garbage disposal unit	Severe	RP	PVB
Gas station customer <i>water</i> kiosk/hose connection	Moderate	DCVA	N/A
Geothermal heat recovery system/heat pump	Severe	RP	N/A
Golf ball/club washer w/o chemical addition	Moderate	DCVA	AVB
Golf ball/club washer w/ chemical addition	Severe	RP	PVB
Heating system SFD (no chemicals added)	Minor	DCAP	N/A
Helipad <i>connections</i>	Severe	RP	N/A
Hose connection – <i>ICI minor hazard</i> process	Minor	DuC	HCVB
Hose connection – <i>ICI moderate hazard</i> process	Moderate	DCVA	AVB
Hose connection – <i>ICI severe hazard</i> process	Severe	RP	PVB
Hospital (active treatment area)	Severe	RP	PVB
Hospital (non-treatment area)	Moderate	DCVA	AVB
Hot press cooling	Severe	RP	N/A
Hot tub/Spa, Commercial, – Direct Feed	Severe	RP	PVB
Hot tub/Spa, MF, – Direct Feed, no chemical	Moderate	DCVA	DCVA
Hot tub/Spa, SFD, – Direct Feed	Minor	DuC	DuC
Humidifier – <i>SFD</i>	Minor	DuC	DuC
Humidifier	Moderate	DCVA	DCVA

Point of Use Cross Connection	Proposed Degree of Hazard	Proposed Backflow Preventer	
		Backpressure & Backsiphonage	Backsiphonage Only
Humidifier with sump (chemicals added)	Severe	RP	PVB
Hydronic Heating System – SFD/MFR / ICI - with chemical addition	Severe	RP	N/A
Hydronic Heating System – ICI - without chemical addition	Severe	RP	N/A
Hydronic Heating System – non potable materials w/o chemical addition – SFD/MFR	Moderate	DCVA	N/A
Hydronic Heating System – potable materials w/o chemical addition – MFR	Moderate	DCVA	N/A
Hydronic Heating System – potable materials w/o chemical addition – SFD	Minor	DCAP	N/A
Ice maker – residential refrigerator type w/o built-in filter - ICI	Minor	DuC	N/A
Ice maker for Commercial application – water supply for ice	Severe	RP	N/A
Ice manufacturing equipment - Industrial	Severe	RP	N/A
Ice making / resurfacing equipment for sports arena	Severe	RP	N/A
Industrial fluid system	Severe	RP	N/A
Industrial vessel / piping flushing	Severe	RP	PVB
Industrial vessel / piping hydrostatic testing	Severe	RP	N/A
Irrigation system (chemicals injected)	Severe	RP	RP
Irrigation system (no chemicals injected)	Moderate	DCVA	DCVA
Irrigation system - single family		DCVS	DCVA
Irrigation system – greenhouse or properties in ALR with or without chemigation	Severe	RP	N/A
Janitor sink with hose connection thread	Moderate	N/A	AVB
Janitor sink with hose extending extendable to below flood level rim and/or detergent dispenser attached	Severe	RP	PVB
Laboratory Equipment – Air compressor	Severe	RP	N/A
Laboratory Equipment – Animal cage washer	Severe	RP	PVB
Laboratory Equipment – Animal water bottle filler (downstream of filter)	Minor	DuC	DuC
Laboratory Equipment – Animal watering system	Severe	RP	PVB
Laboratory Equipment – Aspirator	Severe	RP	PVB
Laboratory Equipment – Autoclave	Severe	RP	N/A
Lab bench equipment (non-toxic)	Minor	DuC	DuC
Laboratory Equipment – Bench equipment	Severe	RP	PVB
Laboratory Equipment – Electron microscope	Severe	RP	PVB
Laboratory Equipment – Equipment cooling	Severe	RP	N/A
Laboratory Equipment – Fume hood	Severe	RP	PVB
Laboratory Equipment – Pipette washer	Severe	RP	N/A
Laboratory Equipment – Serrated faucet	Severe	RP	PVB
Laboratory Equipment – Specimen tank	Severe	RP	PVB
Laboratory Equipment – Spray Hose	Severe	RP	PVB
Laboratory Equipment – Vacuum pump	Severe	RP	PVB
Laser equipment	Severe	RP	N/A
Laundry chute wash down	Severe	RP	PVB

Point of Use Cross Connection	Proposed Degree of Hazard	Proposed Backflow Preventer	
		Backpressure & Backsiphonage	Backsiphonage Only
Laundry tub with hose bibb connection <i>MFR / ICI</i>	Moderate	DCVA	AVB
Lens cutting / grinding equipment	Severe	RP	PVB
Lethal substance	Severe	RP	PVB
Livestock equipment	Severe	RP	PVB
Lubrication pit	Severe	RP	PVB
Meat / fish display case	Moderate	DCVA	AVB
Medical Equipment – Air compressor	Severe	RP	N/A
Medical Equipment – Angio / MRI cooling	Severe	RP	N/A
Medical Equipment – Aspirator	Severe	RP	PVB
Medical Equipment – Autoclave /sterilizer	Severe	RP	N/A
Medical Equipment – Bedpan macerator	Severe	RP	PVB
Medical Equipment – Bedpan sprayer	Severe	RP	PVB
Medical Equipment – Bedpan washer / sterilizer	Severe	RP	N/A
Medical Equipment – Blood analysis equipment	Severe	RP	PVB
Medical Equipment – Burn shower	Severe	RP	PVB
Medical Equipment – CT scan	Severe	RP	N/A
Medical Equipment – Cart washer	Severe	RP	N/A
Medical Equipment – Dialysis equipment	Severe	RP	N/A
Medical Equipment – Dye slide table	Severe	RP	PVB
Medical Equipment – Endoscope	Severe	RP	PVB
Medical Equipment – Equipment / instrument decontamination sink & equipment	Severe	RP	PVB
Medical Equipment – Film processor	Severe	RP	PVB
Medical Equipment – Hose connection / bibb	Severe	RP	RP
Medical Equipment – Hydrotherapy bath	Severe	RP	PVB
Medical Equipment – Laser cooling	Severe	RP	N/A
Medical Equipment – MRI cooling	Severe	RP	N/A
Medical Equipment – Patient tub w/flexible hose	Severe	RP	PVB
Medical Equipment – Renal processor	Severe	RP	PVB
Medical Equipment – Steris washer	Severe	RP	N/A
Medical Equipment – Wash down station	Severe	RP	PVB
Medical Equipment – Vacuum pump	Severe	RP	RP
Medical Equipment – Ultrasonic washer	Severe	RP	PVB
Medical Equipment – X-ray equipment	Severe	RP	RP
Mobile carpet cleaning equipment	Severe	RP	N/A
Mixing tee with steam and <i>water</i>	Moderate	DCVA	N/A
Mortuary or Morgue	Severe	RP	PVB
Optician or Ophthalmology Equipment	Moderate	DCVA	DCVA
Paint booth	Severe	RP	N/A
Parts washer (not acid wash or hot tank)	Severe	RP	PVB
Pedicure spa / bowl	Severe	RP	PVB
Pesticide applicator trucks and equipment	Severe	RP	PVB
Photo developing equipment	Severe	RP	PVB
Photo lab sink / tank	Severe	RP	PVB

Point of Use Cross Connection	Proposed Degree of Hazard	Proposed Backflow Preventer	
		Backpressure & Backsiphonage	Backsiphonage Only
Piping to chemical dispensers	Severe	RP	PVB
Plating tank	Severe	RP	PVB
Poultry barn	Severe	RP	N/A
Pressure washer (no aspirator)	Minor	DuC	N/A
Pressure washer (with aspirator)	Severe	RP	N/A
Private fire hydrant	Moderate	DCDA	N/A
Produce / floral misting system	Moderate	DCVA	AVB
Proofer oven	Moderate	DCVA	N/A
Pump primer line (non-toxic) Not for auxiliary water source pump	Moderate	DCVA	N/A
Pump primer line (toxic) Not for auxiliary water source pump	Severe	RP	N/A
Pump primer line for auxiliary water source pump	Severe	AG	AG
Radiator flushing equipment	Severe	RP	PVB
Recreational vehicle dump station	Severe	RP	RP
Refrigeration unit - industrial	Severe	RP	RP
Restricted area	Severe	RP	RP
Reverse osmosis equipment - <i>SFD</i> w/o chemical cleaning and/or backwashing	Minor	DuC	DuC
Reverse osmosis equipment with chemical cleaning and/or backwashing	Severe	RP	RP
Reverse osmosis equipment - <i>MFR / ICI</i> w/o chemical cleaning and/or backwashing & inlet less than 25mm	Moderate	DCVA	DCVA
Reverse osmosis equipment - <i>MFR / ICI</i> inlet 25mm or greater	Moderate	RP	RP
Rock drill	Severe	RP	N/A
Rock polisher	Severe	RP	PVB
Rock / pavement saw	Severe	RP	PVB
Sanitary equipment	Severe	RP	PVB
Service sink w/hose connection thread ICI properties	Moderate	DCVA	AVB
Service sink w/hose extendable to below flood level rim - industrial properties and properties with severe hazard	Severe	RP	PVB
Sewage ejector	Severe	RP	PVB
Sewage pump	Severe	RP	N/A
Sewage lift station standpipe	Severe	RP	N/A
Sewer connected equipment	Severe	RP	PVB
Sewer flushing hose / equipment	Severe	RP	N/A
Shampoo sink	Moderate	DCVA	AVB
Silver recovery unit	Severe	RP	PVB
Sizing vat	Severe	RP	PVB
Solar energy unit - <i>SFD</i> with no chemical added, potable piping material	Minor	DCAP	N/A
Solar energy unit - <i>MFR</i> with no chemical added, potable piping material	Moderate	DCVA	N/A
Solar energy unit - <i>SFD/MFR</i> with no chemical added, non-potable piping material	Moderate	DCVA	N/A

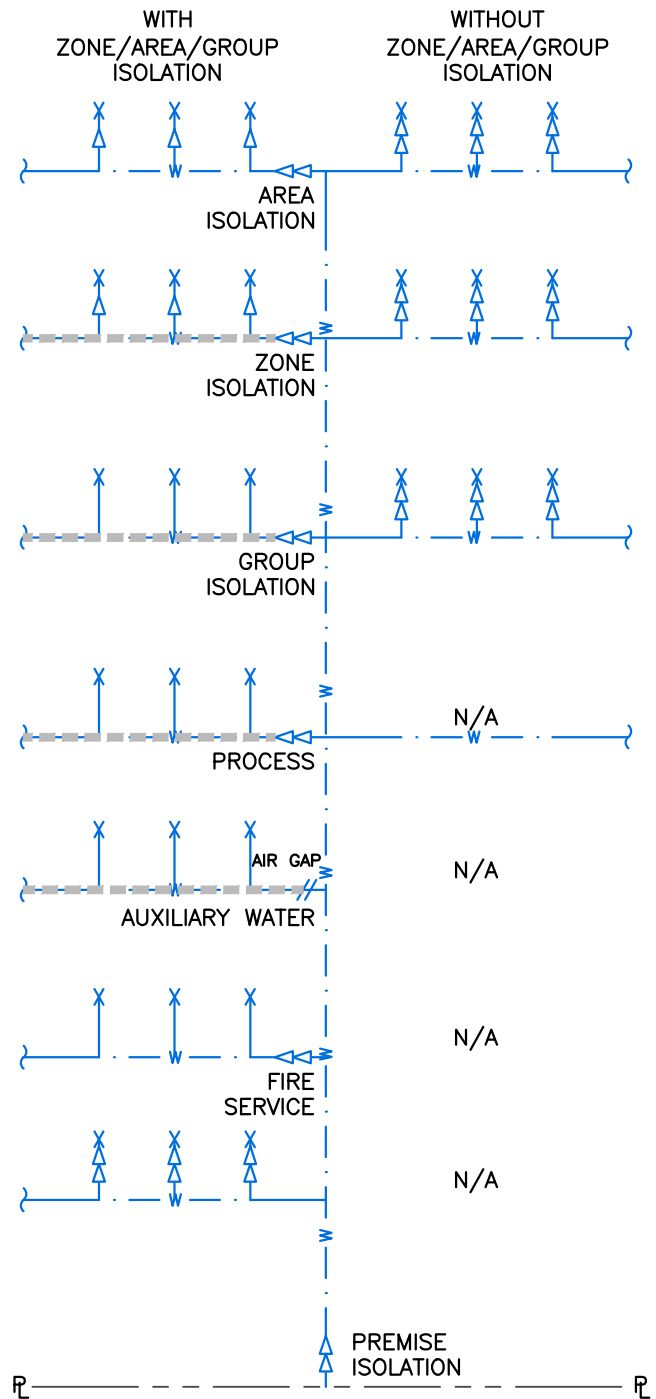


Point of Use Cross Connection	Proposed Degree of Hazard	Proposed Backflow Preventer	
		Backpressure & Backsiphonage	Backsiphonage Only
Solar energy unit - ICI	Severe	RP	N/A
Solar energy unit - chemical added	Severe	RP	N/A
Solution tank	Severe	RP	PVB
Sonic washer	Severe	RP	PVB
Solvent recycling equipment	Severe	RP	PVB
Solvent washer	Severe	RP	PVB
Specimen tank	Severe	RP	PVB
Steam cleaner	Moderate	DCVA	N/A
Steam generator (small unit contained within appliance/equipment) – w/o chemical addition	Moderate	DCVA	N/A
Still (water purifier or brewery equipment)	minor	DuC	DuC
Storm sewer	Severe	RP	PVB
Sump	Severe	RP	PVB
Swimming pool – Direct feed	Moderate	DCVA	AVB
Swimming pool (other than residential)	Moderate	DCVA	AVB
Swimming pool makeup tank	Moderate	DCVA	AVB
Swimming pool (residential )	Minor	DuC	DuC
Tanning booth	Severe	RP	PVB
Teeth cleaning equipment (veterinary type)	Severe	RP	PVB
Trackside <i>connection</i> to train	Severe	RP	N/A
Trap priming connection (Trap primer)	Severe	RP	PVB
Vacuum pump – <i>ICI</i>	Severe	RP	PVB
Vending Machine (No carbonater)	minor	DuC	DuC
Veterinary equipment – see medical equipment	Severe	RP	PVB
Wash rack	Severe	RP	PVB
Wash tank (toxic)	Severe	RP	PVB
Washlette	Severe	RP	PVB
Waste water treatment process	Severe	AG	AG
<i>Water</i> cooled equipment	Severe	RP	N/A
<i>Water</i> cooled equipment	Severe	RP	N/A
Wash down equipment	Severe	RP	PVB
<i>Water</i> filter – <i>SFD</i>	Minor	DuC	DuC
<i>Water</i> Filter – <i>MFR / ICI</i> filter inlet < 25mm	Moderate	DCVA	DCVA
<i>Water</i> filter – <i>MFR / ICI</i> filter inlet 25mm and larger	Severe	RP	PVB
<i>Water</i> hauling equipment – other than <i>City</i> approved potable usage equipment	Severe	RP	RP
<i>Water</i> operated equipment (hydraulic) no chemical added (not aspirators/ejectors)	Moderate	DCVA	N/A
<i>Water</i> operated equipment (hydraulic) with chemical added (not aspirators/ejectors)	Severe	RP	N/A
<i>Water</i> softener - <i>SFD</i>	Minor	DuC	N/A
<i>Water</i> softener - <i>ICI</i>	Severe	RP	N/A
<i>Water</i> softener drain	Severe	RP	PVB

Point of Use Cross Connection	Proposed Degree of Hazard	Proposed Backflow Preventer	
		Backpressure & Backsiphonage	Backsiphonage Only
Water treatment (ph balancing)	Severe	RP	N/A
Water treatment / filtering and dispensing equipment	Severe	RP	N/A
X-ray equipment – <i>ICI</i>	Severe	RP	N/A
Yard Hydrant – <i>minor to moderate hazard</i> process	Moderate	DCVA	N/A
Yard Hydrant – <i>severe hazard</i> process	Severe	RP	N/A

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TYPE	SELECTION	BACKFLOW PREVENTER
AREA ISOLATION (POTABLE & NON-POTABLE CONNECTIONS)	APPENDIX I	NON-TESTABLE DEVICE MAY BE USED TO ISOLATE BACK SIPHONAGE FROM MODERATE HAZARD
ZONE ISOLATION (NO POTABLE CROSS CONNECTIONS)	APPENDIX I	NON-TESTABLE DEVICE MAY BE USED TO ISOLATE BACK SIPHONAGE FROM MODERATE TO SEVERE HAZARD
GROUP ISOLATION (IDENTICAL OR NON IDENTICAL POINT OF USE CROSS CONNECTION) w/ POTABLE CROSS CONNECTIONS	APPENDIX III	INDIVIDUAL POINT OF USE ISOLATION MAY NOT BE REQUIRED, PROVIDING EACH FIXTURE CANNOT ADVERSELY AFFECT THE WATER QUALITY OR OPERATION OF THE OTHERS
INDUSTRIAL PROCESS	RP OR AIR GAP	INDIVIDUAL POINT OF USE ISOLATION MAY NOT BE REQUIRED. NO POTABLE USE DOWNSTREAM OF ISOLATION BFP. NON-POTABLE LABELING REQUIRED
AUXILIARY WATER (eg. RAIN WATER HARVEST, GREY WATER, GREENHOUSE IRRIGATION WATER RE-USE)	AIR GAP	NO INDIVIDUAL POINT OF USE ISOLATION REQUIRED. NO INTER-CONNECTIONS ALLOWED TO POTABLE SYSTEM.
FIRE SERVICE (HYDRANTS, SPRINKLERS, STANDPIPES, GROUP ISOLATION)	APPENDIX II	NO INDIVIDUAL POINT OF USE ISOLATION REQUIRED
POINT OF USE OR FUTURE ISOLATION	APPENDIX III	INDIVIDUAL POINT OF USE ISOLATION REQUIRED
PREMISE ISOLATION	APPENDIX I	



LEGEND	
X	POINT OF USE CROSS CONNECTION
△	NON-TESTABLE BACKFLOW PREVENTER
△△	TESTABLE BACKFLOW PREVENTER OR AIR GAP
	AIR GAP
---	PIPING - NON-POTABLE

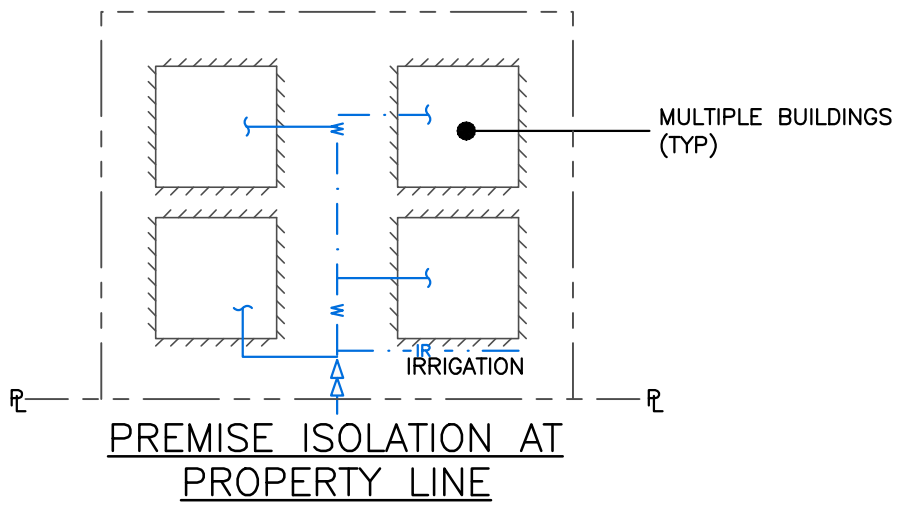
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Revision	Date
Approved	

Title	CROSS CONNECTION CONTROL TYPES OF ISOLATION
Approved	
Date	MAY 2014
Drawn By	Urban Systems

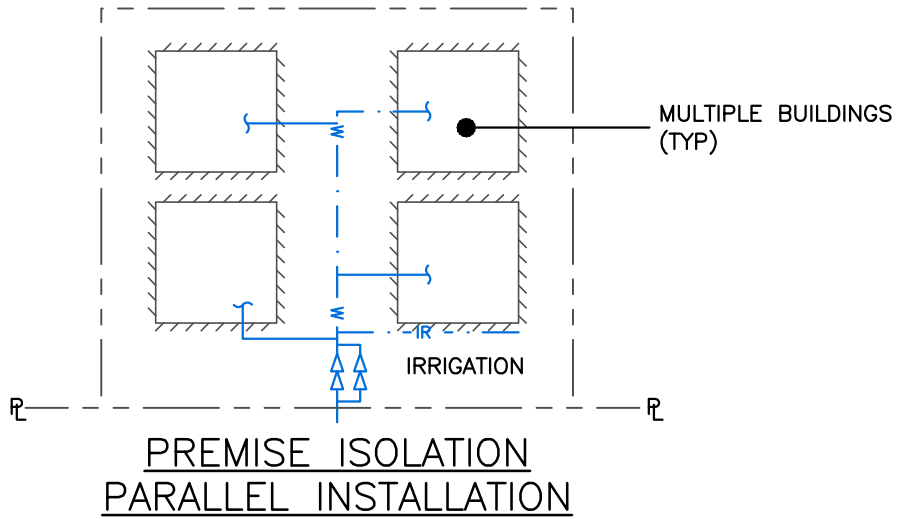
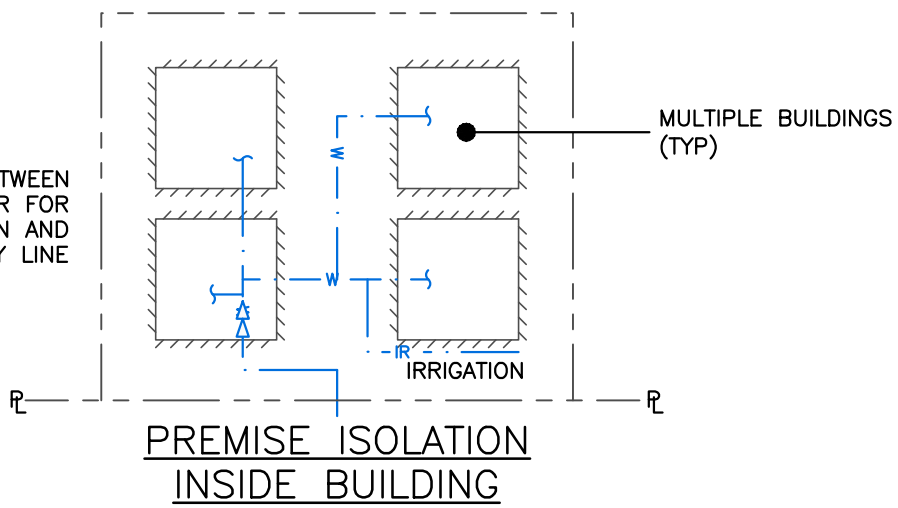

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**CROSS CONNECTION CONTROL STANDARDS**

Approved		DRAWING NUMBER
Date	MAY 2014	FIG 1
Drawn By	Urban Systems	



NO BRANCHING OFF BETWEEN BACKFLOW PREVENTOR FOR PREMISE ISOLATION AND PROPERTY LINE



PLAN VIEW

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Revision	Date
Approved	

REFER TO LEGEND ON FIG 1.

Title CROSS CONNECTION CONTROL  
PREMISE ISOLATION LOCATION / CONFIGURATION

CROSS CONNECTION CONTROL STANDARDS

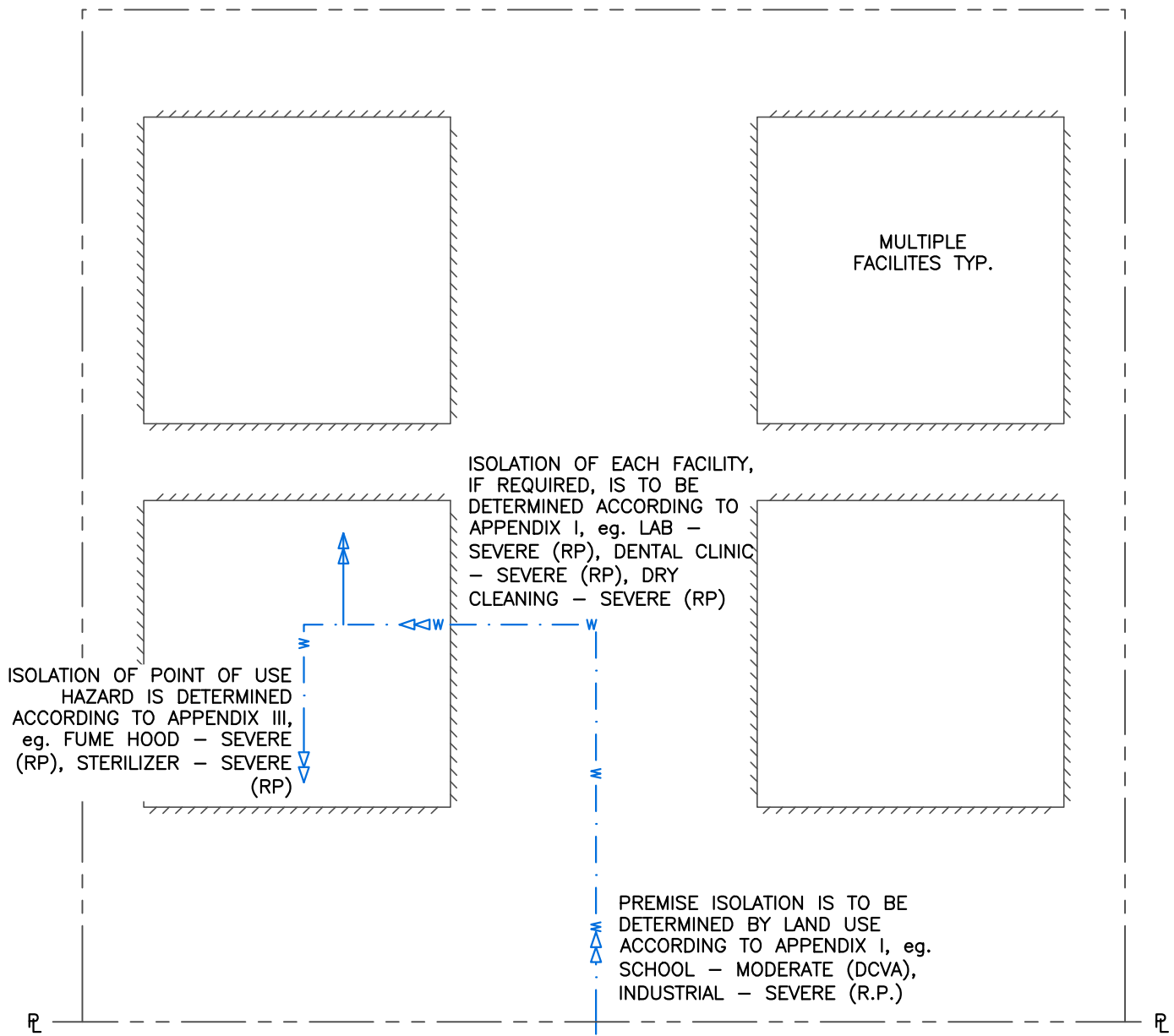
Approved

Date MAY 2014


Drawn By Urban Systems

DRAWING NUMBER

FIG 2



**PLAN VIEW**

3		REFER TO LEGEND ON FIG 1.
2		
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Revision	Date	Approved
		<b>CROSS CONNECTION CONTROL STANDARDS</b> Approved Date: MAY 2014 Drawn By: Urban Systems
		DRAWING NUMBER <b>FIG 3</b>