

City of Harrisonburg
Cross Connection/Backflow Prevention
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CROSS CONNECTION

I. INTRODUCTION

The City of Harrisonburg Cross Connection and Backflow Protection Program, hereafter referred as CCBPP, is empowered under the “Charter and Code of Ordinances City of Harrisonburg” Section 11, Chapter 5. The City of Harrisonburg has a need for concern and action on our part to protect the water system from pollution or contamination.

The purpose of the cross connection control program shall be:

- (1) To protect the public potable water supply of the city and the city's complete water distribution system from the possibility of contamination or pollution by isolating within its customers' internal distribution systems contaminants or pollutants which could backflow into the public water supply.
- (2) To eliminate or control the existing cross connection, actual or potential, at each water outlet from the consumers' service lines and
- (3) To provide for the maintenance of a continuing program of cross connection control which will systematically and effectively prevent the contamination or pollution of the potable water system.

It should be noted that, under certain circumstances, atmospheric vents and relief valves on backflow preventers could allow the entry of aerosols, toxic fumes, or airborne solid particles into the system. Bypass arrangements, jumper connections, removable sections, swivel or changeover assemblies, hoses or hose bibs, or any other temporary or permanent connecting arrangement through which, or because of which, backflow can or may occur, are considered to be cross connections.

II. AWWA STATEMENT ON CROSS CONNECTION

Below is a policy statement on Cross-Connection control released by AWWA Board of Directors on January 26, 1970, and reaffirmed on June 10, 1984.

The American Water Works Association recognizes that the water purveyor has a responsibility to provide its customers at the service connection with water that is safe under all foreseeable circumstances. Thus, in the exercise of this responsibility the water purveyor must take reasonable precaution to protect the community distribution system from the hazards originating on the premises of its customers that may degrade the water in the community distribution system.

*Cross-Connection control and plumbing inspections on premises of water customers are regulatory in nature and should be handled through the rules, regulations, and recommendations of the health authority or the plumbing code enforcement agencies having jurisdiction. The water purveyor, however, should be aware of any situation requiring inspection and/or re-inspection necessary to detect hazardous conditions resulting from cross connections. If in the opinion of the utility, effective measures consistent with the degree of hazard have not been taken by the regulatory agency, the water purveyor should take such measures as the utility may deem necessary to ensure that the community distribution system is protected from contamination. **Such action would include the installation of a backflow prevention assembly, consistent with the degree of hazard, at the service connection or discontinuance of the service.***

In addition, customer use of water from the community distribution system for cooling or other purposes within the customer's system and later return of the water to the community distribution system is not acceptable.

III. BACKGROUND

The "Virginia Waterworks Regulations", Article 3, 12 VAC 5-580-630 General, requires as a condition for the issuance and continued use of a waterworks permit, that each purveyor establish and enforce a program of cross connection and backflow prevention. Whereas the regulations hold accountable the City of Harrisonburg Department of Public Utilities, the organization structure to undertake the goal has been met by cooperative interaction among three City Departments. This interactive relationship is outlined as follows:

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➤ Community Development

- The building official oversees the installation of new backflow devices under the guidelines of the USBC, International Plumbing Code, and the City's plumbing permit program.
- The building official oversees the annual testing as outlined in the Virginia Maintenance Code.
- The building official holds, by provisions authorized by the USBC, the authority to investigate concerns with existing cross connection matters within privately owned domains.
- The building official provides recommendation to legal staff to take action against repeat violators.

➤ Public Utilities

- Public Utilities co-review new fire suppression installations in coordination with Community Development.
- Provide installation of water usage monitoring equipment.
- Coordinate any updated VDH requirements as needed with Community Development.

➤ Fire Department

- Fire Department conducts annual inspections of all existing fire suppression systems.

IV. CITY OF HARRISONBURG CROSS CONNECTION CONTROL PROGRAM ORDINANCE:

CHAPTER 5. CROSS-CONNECTION CONTROL PROGRAM

[§ 11-5-1. Definitions.](#)

[§ 11-5-2. Program established.](#)

[§ 11-5-3. Purpose of program.](#)

[§ 11-5-4. Conformance with the Virginia \(USBC\).](#)

[§ 11-5-5. Right of entry.](#)

[§ 11-5-6. Installation.](#)

[§ 11-5-7. Inspections.](#)

[§ 11-5-8. Violations.](#)

Sec. 11-5-1. Definitions.

Refer to the USBC, International Plumbing Code, Virginia Maintenance Code, Protection of Potable Water Supply, Statewide Fire Prevention Code, for current and up-to-date definitions. (Ord. of 2-10-04)

Sec. 11-5-2. Program established.

There is hereby established a cross connection control program which shall be administered by the building official, department of planning and community development, building inspection division, hereafter referred to as the director. (Ord. of 2-10-04)

Sec. 11-5-3. Purpose of program.

The purpose of the cross connection control program shall be:

- (1) To protect the public potable water supply of the city and the city's complete water distribution system from the possibility of contamination or pollution by isolating within its customers' internal distribution systems contaminants or pollutants which could backflow into the public water supply.
- (2) To eliminate or control the existing cross connection, actual or potential, at each water outlet from the consumers' service lines; and
- (3) To provide for the maintenance of a continuing program of cross connection control which will systematically and effectively prevent the contamination or pollution of the potable water system.

(Ord. of 2-10-04)

Sec. 11-5-4. Conformance with the USBC Cross Connection Control Program.

The cross connection control program is regulatory in nature and, therefore, must be in conformance with the rules, regulations, and recommendations of the enforcing agency of the city, as well as the State Water Works Regulations approved by the State Board of Health, and the USBC--International Plumbing Code, Virginia Maintenance Code, and Statewide Fire Prevention Code. (Ord. of 2-10-04)

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Sec. 11-5-5. Right of entry.

Refer to chapter 1 of this title (right of entry).
(Ord. of 2-10-04)

Sec. 11-5-6. Installation.

Backflow preventing devices shall be accessibly located, preferably in the same room as the fixture they are serving. In all cases, installation shall be in accordance with the manufacturer's recommendations, and the USBC, whichever contains the higher standards.
(Ord. of 2-10-04)

Sec. 11-5-7. Inspections.

It shall be the duty of the owner of any premises where backflow protective devices are installed to have competent inspections performed at least once a year, or more often in those instances where deemed necessary by the director. These inspections shall be conducted by certified backflow preventer testers, certified by the state department of professional and occupational regulations. The devices shall be tested, repaired, overhauled, or replaced, at the expense of the water user. Records of all backflow preventer tests, repairs, overhaul, or replacement, shall be kept by the certified tester; with a copy sent to the building inspection office.
(Ord. of 2-10-04)

Sec. 11-5-8. Violations.

Penalties for violations for this chapter shall be as set forth in chapter 1 of this title (general penalty).
(Ord. of 2-10-04)

V. ADMINISTRATION

The City of Harrisonburg Building Official shall be the Director and shall administer and enforce this program.

The CCBPP will enforce regulations and ordinances in the following areas:

- Annual testing of assemblies
- Licensing of testers engaged in testing of assemblies
- Authority to enter premises
- Authority to cause termination of the water service in case of noncompliance

It is essential that the Director keep adequate records of all transactions and correspondence, with particular emphasis being placed on developing a record system that accommodates monitoring the following:

- Installation date of assemblies
- Location of backflow-prevention assemblies
- Inspection and testing of backflow-prevention assemblies, and
- Performance of backflow-prevention assemblies

VI. INSPECTION

For new installations, inspections will be performed by a licensed third party inspector at the initial installation of the assembly and before water service is supplied thru the device. Existing installations will comply with the annual testing requirements.

VII. ANNUAL TESTING

Annual testing shall be performed as outlined in the Virginia Maintenance Code. Correction notices and notice of violations will be executed as outlined in the VMC. Correction notices shall have a seven calendar day time frame for correction from the receipt date of notification before a notice of violation is issued or a notice of violation can be issued as outlined in the VMC. Notice of violations shall have a seven calendar day time frame from the receipt date of notification to comply or disconnection of the water service shall occur.

The Director, when requested in writing by the building owner, may give permission to waive the testing requirements if the water service has been disconnected by the water department and the building becomes vacant for an extended period of time. Prior to reoccupying the building, a current inspection will be required before water service is supplied thru the device.

VIII. RECORDS

A. An up-to-date listing of water supply system owners who have cross-connection control devices (including air gaps) shall be maintained by the Director. The list will contain:

- Owner of premises
- Address of device
- Location of device
- Manufacturer of device
- Device model number
- Device serial number
- Device size
- Inspector
- Inspection status

B. CCBPP inspection and testing reports will be maintained by the Director for a minimum of 3 (three) years as outlined in the Library of Virginia. These reports will contain the information as outlined in item A above.

C. Testers and Equipment

- Testers must be licensed by the Virginia DPOR as a backflow prevention device worker.
- All Virginia certified backflow prevention device workers must obtain and employ backflow prevention assembly test equipment which is checked for accuracy annually, calibrated, if necessary, and certified to the City of Harrisonburg as to such accuracy/calibration employing a calibration method traceable to a national standard.
- With the exception of “Class A” state registered contractors, a certificate of insurance in the amount of not less than five hundred thousand dollars (\$500,000) property damage and one million dollars, (\$1,000,000) bodily injury to cover premise operations and completed operations.

IX. DEVICE SELECTION/GUIDELINES

The control of backflow, whether caused by backpressure or backsiphonage, requires the installation of an air gap or backflow-prevention assembly. General methods or types of approved assemblies for backflow prevention include:

- Air Gap (AG)
- Reduced-pressure principle backflow-prevention assembly (RPBA)
- Double check valve assembly (DCVA)
- Pressure vacuum breaker (PVB)
- Atmospheric vacuum breaker (AVB)

CROSS CONNECTION IN ANY MANNER IS PROHIBITED!!!

- A. Air Gaps give the highest degree of protection and shall be used whenever practical to do so in high hazard situations subject to back pressure.
- B. An air gap separation and a reduced pressure principle backflow prevention device will not protect against back pressure, but will protect against backsiphonage when operating properly.
- C. Backflow prevention devices consisting of dual independent check valves with or without an intermediate atmospheric vent shall only be used in low hazard situations.
- D. Barometric loops are not acceptable.
- E. Reduced pressure principle type backflow preventers shall not be installed in pits or areas subject to flooding.

Each Hazard should fall into one of 2 (two) degrees:

Health (contaminant): An impairment of the quality of the potable water that creates an actual hazard to the public health through poisoning or through the spread of disease by sewage, industrial fluids or waste.

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Non-health (pollutant): An impairment of the quality of the potable water to a degree that does not create a hazard to the public health but that does adversely and unreasonably affect the aesthetic qualities of such potable water for domestic use.

Premises that fall into the classification of contaminant or pollutant hazards shall be considered for premises isolation from the purveyor's water system which include but are not limited to the following:

- Premises where inspection is restricted;
- Hospitals, mortuaries, clinics, and so forth;
- Laboratories;
- Piers, docks, and other waterfront facilities;
- Sewage treatment plants and sewage lift stations;
- Food and beverage processing plants;
- Chemical plants using a water process;
- Metal plating plants;
- Petroleum processing or storage plants;
- Radioactive material processing plants or nuclear reactors;
- Irrigation systems;
- Car washing facilities; and
- Premises with reclaimed water systems.

Device Selection Guidelines

- International Plumbing Code and referenced standards.
- CAN/CSA B64-10-01 standard.

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BACKFLOW PREVENTION DEVICE SELECTION GUIDE

| Type of Cross-Connection | Degree of Hazard | MINIMUM Source Isolation Device | MINIMUM Premises Isolation Device |
|-------------------------------------|------------------|--|-----------------------------------|
| Abattoir (slaughter house) | Severe | | RP |
| Air compressor oil cooler | Moderate | DCVA | |
| Agricultural chemicals (sprayers) | Severe | AG, RP | |
| Animal watering | Moderate | AVB, PVB, DCVA | |
| Apartment building | Moderate | | DCVA |
| Aspirator (toxic) | Severe | RP, AVB | |
| Aspirator (non-toxic) | Moderate | AVB, LFVB | |
| Autoclave | Severe | AVB, PVB NOTE: Zone RP protection required | |
| Automotive Plant | Severe | | RP |
| Automotive repair shop | Severe | | RP |
| Autopsy and mortuary equipment | Severe | AVB,PVB NOTE: Zone RP protection required | |
| Baptistery | Moderate | AVB, PVB, DCVA | |
| Basin | Moderate | AG | |
| Bathtub (all) | Moderate | AG | |
| Bedpan washer | Severe | AVB, PVB, NOTE: Zone RP protection required | |
| Bidet | Severe | AVB | |
| Bottle washer | Moderate | AG, AVB | |
| Bottle washer below flood level rim | Severe | RP, PVB | |
| Beverage processing plant | Severe | | RP |
| Canopy washer | Severe | AVB, RP | |
| Car wash | Severe | | RP |

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|--|----------|-----------------------------------|------|
| Carbonator | Moderate | DCAP (stainless steel or plastic) | |
| Chemical feed tank | Severe | AG, RP | |
| Chemical plant | Severe | | RP |
| Chiller tank | Severe | AG, RP | |
| Chlorinator | Severe | RP | |
| Clothes washer | Severe | AG, AVB | |
| Coffee machine | Moderate | AG, DCAP | |
| College | Moderate | | DCVA |
| Commercial coin-operated laundry | Moderate | AG, AVB | |
| Commercial laundry | Severe | RP | |
| Condensate tank (top feed) | Moderate | AG, AVB, DCVA | |
| Condensate tank (bottom feed) | Severe | RP | |
| Cooking kettle | Moderate | AG, AVB | |
| Cooling condenser (solenoid upstream) | Moderate | DCAP | |
| Cooling condenser (solenoid downstream) | Severe | RP | |
| Cooling tower | Severe | RP, AG | |
| Deaerator (top feed) | Moderate | DCVA | |
| Deaerator (bottom feed) | Severe | RP | |
| Degreasing equipment system | Severe | RP | |
| Deionized water | Severe | RP | |
| Dental Vacuum pump | Severe | RP, AVB, PVB | |
| Dental office | Moderate | | DCVA |
| Dental high speed hand piece and air and water syringe | Moderate | not required | |
| Dental Cuspidor (with internal air gap) | Moderate | AG | |
| Dental Cuspidor (no air gap) | Severe | RP, AG | |
| Detergent dispenser | Severe | AVB, RP | |
| Dish rinse unit with flex hose | Moderate | AG, AVB, DCAP | |
| Dishwasher (commercial) | Moderate | AG, AVB, | |

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| Distiller | Moderate | AG | |
| Dockside marine facility | Severe | | RP |
| Dye plant | Severe | | RP |
| Emergency eyewash/Shower – this equipment must be installed upstream of the zone isolation | | | |
| Fire Protection Systems – General Conditions Installations shall be in accordance to the appropriate NFPA Standard. | | | |
| Residential full flow through fire sprinkler system constructed with potable water system materials | | | No protection required |
| Residential partial flow through fire sprinkler system constructed with potable water system materials | | | DCVA |
| Class 1, Class 2 or Class 3 fire sprinkler/standpipe systems- no antifreeze | | | DCVA |
| Class 1, Class 2, Class 3 fire sprinkler/standpipe systems with antifreeze or other additives | | | RP |
| Class 4, Class 5 fire sprinkler/standpipe systems | | | RP |
| Class 6 fire sprinkler/standpipe system | | | DCVA |
| Class 6 fire sprinkler/standpipe system where a potentially severe health hazard may exist | | | RP |
| Dry sprinkler or standpipe system | | | No protection |
| Fire Hydrant | | | No protection |
| Fire Service main connected to more than one of the following different sources of supply: (i) City water supply system (ii) a private water supply system or (iii) a source of non-potable water | | | RP |
| Flexible shower head | Moderate | AVB | |
| Floor drain with flushing rim | Severe | AG, RP | |
| Flush tank | Moderate | AG, AVB | |
| Flushing equipment device | Severe | AG, AVB, PVB | |

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| Flushometer | Severe | AVB | |
| Food processing plant | Severe | | RP |
| Fountain, ornamental | Moderate | AG, AVB, PVB, DCVA | |
| Fountain, ornamental (chemical added) | Severe | AG, AVB, PVB, RP | |
| Funeral Home | Severe | | RP |
| Garbage disposal unit | Severe | AVB, PVB, RP | |
| Garbage can washer | Severe | AG, AVB, PVB, RP | |
| Heating System (copper/plastic; no chemicals) | Moderate | DCAP | |
| Heating System (no chemicals added) | Moderate | DCVA | |
| Heating System (chemicals added) | Severe | RP | |
| Hose bib | Moderate | HCVB | |
| Hospital (non-treatment area) | Moderate | | DCVA |
| Hospital (active treatment area) | Severe | | RP |
| Hot tub | Moderate | AG, AVB | |
| Humidifier | Moderate | AG, DCAP | |
| Humidifier with sump | Severe | AG, RP | |
| Hydrotherapy bath | Moderate | AG, AVB | |
| Industrial fluid system | Severe | RP | |
| Irrigation system (chemical injected) | Severe | RP | |
| Irrigation system (pop up head & underground soaker) | Severe | RP, PVB (Locate 12" above highest point in system) | |
| Irrigation system (no chemical added) | Moderate | AVB, PVB, DCVA | |
| Lab bench equipment (toxic) | Severe | AVB, LFVB NOTE: Zone RP protection required | |
| Lab bench equipment (non toxic) | Moderate | AVB, LFVB | |
| Laboratory | Severe | | RP |
| Laboratory Faucet | Severe | LFVB, AVB NOTE: Zone RP protection required | |

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| Laundry machine | Moderate | AG, AVB | |
| Laundry tub faucet with hose bib connection | Moderate | HCVB, AVB | |
| Lavatory | Moderate | AG | |
| Lethal substance | Severe | AG, RP | |
| Livestock equipment | Severe | RP | |
| Mall – multi-tenant | Moderate | | DCVA |
| Manufacturing Plant (not specified) | Moderate | | DCVA |
| Meat Packing plant | Severe | | RP |
| Milk processing plant | Severe | | RP |
| Mixing tee with steam and water | Moderate | DCVA | |
| Mobile home park | Moderate | | DCVA |
| Mop sink faucet with hose bib connection | Moderate | HCVB, AVB | |
| Mortuary or morgue | Severe | | RP |
| Office Building | Moderate | | DCVA |
| Oil Refinery | Severe | | RP |
| Paint manufacturing plant | Severe | | RP |
| Penitentiary | Moderate | | DCVA |
| Petroleum processing or storage facility | Severe | | RP |
| Photo lab sink | Severe | AG, AVB, RP | |
| Pipette washer | Severe | AG, AVB, RP | |
| Plant using radioactive material | Severe | | AG |
| Plastic manufacturing plant | Severe | | RP |
| Plating shop | Severe | | RP |
| Plating tank | Severe | PVB, RP | |
| Pleasure boat marina | Severe | | RP |
| Potato peeler | Moderate | AG, AVB | |
| Pressure washer (no aspirator) | Moderate | AG, DCAP | |
| Pressure washer (with aspirator) | Severe | AG, RP | |
| Printing plant | Severe | | RP |

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| Pump primer line (toxic) | Severe | RP, AG, | |
| Pump primer line (non-toxic) | Moderate | DCAP, DCVA | |
| Radiator shop | Severe | | RP |
| Refinery, petroleum processing | Severe | | RP |
| Research building | Severe | | RP |
| Residential premises-multi-tenant | Moderate | | DCVA |
| Restricted area | Severe | | RP |
| Reverse osmosis | Moderate | AG (at drain) | |
| Reverse osmosis with chemical cleaning | Severe | RP | |
| School | Moderate | | DCVA |
| Serrated faucet | Severe | AVB, LFVB | |
| Sewage treatment plant | Severe | | RP |
| Sewage ejector | Severe | AG | |
| Sewage pump | Severe | AG | |
| Shampoo sink | Moderate | AVB | |
| Shopping mall | Moderate | | DCVA |
| Sizing vat | Severe | AG, AVB, PVB, RP | |
| Solar energy unit | Severe | RP | |
| Solution tank | Severe | AG, RP | |
| Specimen tank | Severe | AG, AVB, PVB NOTE: Zone RP protection required | |
| Steam boiler plant | Severe | | RP |
| Steam table | Moderate | DCAP, AG | |
| Steam generator | Moderate | DVCA | |
| Steam cleaner | Moderate | DCVA | |
| Sterilizer (condensate cooling only) | Moderate | AVB, DCAP | |
| Sterilizer (connection into chamber) | Severe | RP | |
| Still | Moderate | AG (at drain) | |

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| Storage Warehouse | Moderate | | DCVA |
| Swimming pool | Moderate | AG, AVB: Zone RP protection required | |
| Swimming pool (direct connection) | Moderate | AVB, PVB, DCVA NOTE: Zone RP protection required | |
| Swimming pool makeup tank | Moderate | AG, AVB, PVB, DCVA | |
| Technical institute | Moderate | | DCVA |
| Track-side facilities for trains | Severe | | RP |
| Trap primer | Severe | AG, RP, air gap fitting | |
| University | Moderate | | DCVA |
| Vegetable sprayer | Moderate | AG, DCAP | |
| Veterinary clinic | Moderate | | DCVA |
| Veterinary clinic (special equipment) | Severe | | RP |
| Vending machine with carbonator | Moderate | DCAP (stainless steel & plastic) | |
| Vending machine (with filter) | Moderate | DCAP | |
| Water closet (tank type)(N/A if constructed after 1995) | Moderate | AVB | |
| Water closet (flushometer type) | Moderate | AVB | |
| Water hauling equipment (non-toxic) | Moderate | AG, DCVA | |
| Water hauling equipment (toxic) | Severe | AG | |
| Water softener, commercial | Moderate | DCVA, (AG at drain) | |
| X-ray equipment | Severe | AG, RP | |

NOTE: AG = air gap; AVB = atmospheric vacuum breaker; DCVA = double check valve backflow-prevention assembly; PVB = pressure vacuum breaker; RPBA = reduced-pressure principle backflow-prevention assembly. *AVBs and PVBs may be used to isolate health hazards under certain conditions, that is, backsiphonage situations. Additional area or premises isolation may be required. Where a greater hazard exists (due to toxicity or other potential health impact) additional area protection with RPBA is required.

X. REPORTING CONTAMINATION OR SUSPECTED CONTAMINATION

Any device tester or other person shall report contamination or the suspicion of contamination to any one or all of the following:

City of Harrisonburg Building Official
540-432-7700

City of Harrisonburg Public Utilities Director
540-434-6783

The City of Harrisonburg will be responsible for investigating reports and will be responsible for notifying the appropriate Virginia Department of Health, Office of Water Programs, and Lexington Field Office at 540-463-7136.

XI. INSTALLATION REQUIREMENTS

A. General

1. All backflow prevention assemblies shall be installed in accordance with the specifications furnished by the manufacturer's installation instructions.
2. All backflow prevention assemblies shall be installed according to the requirements outlined in the Uniform Statewide Building Code.
3. All new construction plans and specifications shall be submitted at the time of permit application for review and approval and to determine the degree of hazard.
4. Ownership and maintenance of the assembly shall be the responsibility of the customer.
5. All double check valve assemblies installed below ground must be in a drainable vault. The vault shall have positive drainage with adequate gravity drainage to daylight. Below ground installations with gravity drain to storm drainage systems are NOT acceptable.

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6. Reduced pressure principle assemblies must be installed in an easily accessible location in which no portion of the assembly can become submerged under any circumstances (pit and/or below grade installations are prohibited).
7. All devices shall be installed in an accessible location with clearances to inspect or replace the device.
8. The installation of a backflow prevention assembly which is not approved must be replaced with an approved backflow prevention assembly.
9. The installer is responsible to make sure a backflow prevention assembly is working properly upon installation by having a third party inspection immediately after installation and before water service is supplied through the device.
10. Following installation, all RPZ, DCVA, PVB, DCDA, and RPDA are required to be tested by a Virginia certified backflow prevention assembly tester. The following information shall be submitted at the initial inspection:
 - Owner of premises
 - Address of device
 - Location of device
 - Manufacturer of device
 - Device model number
 - Device serial number
 - Device size
 - Inspector
 - Inspection status

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11. A final inspection shall be made by the building inspection division at which time the third party inspection report shall be submitted.

B. Requirements for above ground installations of reduced pressure principle and double check valve assemblies.

1. The backflow preventer must be installed a minimum distance of 5 (five) feet from the meter service. Installations of backflow preventers within the utility right of way will not be approved.
2. Reduced pressure principle assemblies must be installed in a horizontal position or a vertical position and in a location in which no portion of the assembly can become submerged under any circumstance.
3. Double check valve assemblies may be installed in a vertical position provided the flow of water is in an upward direction.
4. Reduced pressure principle backflow preventers, must be installed above ground. Double check valve assemblies must be installed above ground wherever a drainable vault cannot be used. Backflow prevention assemblies installed inside the building are preferred.
5. Backflow preventers installed inside must be a minimum distance of 12 (twelve) inches above the floor, and no higher than 4 (four) feet above the floor, with adequate clearance around the backflow preventer for testing, and/or repair of the backflow prevention assembly. Wherever a reduced pressure principle backflow preventer is installed inside a building, an air gap drain line large enough to carry off the discharge of water from the relief valve shall be installed.

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6. Backflow prevention assemblies installed outside, above ground, must be protected from freezing. The backflow prevention assembly must be installed a minimum distance of 12 (twelve) inches above the ground, and no higher than 4 (four) feet above ground. Landscaping is allowed around the backflow preventer, but must in no way interfere with the required annual testing, and/or repair of the backflow prevention assembly. AVB preventers must be 12" (twelve inches) above highest fixture.
 7. Backflow prevention assemblies 2" (two inches) and larger must be supported to allow for the weight of the backflow prevention assembly. Support construction can be cinder block, brick, and steel or approved plastic supports. Supports must have a proper footing (4" (four inches) of concrete for supports to rest upon. Backflow prevention assembly supports must not interfere with the valves, test cocks, testing, and/or repair of the backflow prevention assembly.
 8. All piping must be in accordance with the International Plumbing Code.
- C. Requirements for below ground installation of double check valve assembly backflow preventers 2 ½" and larger.**
1. Double check valve assembly backflow preventers installed below ground must be in a drainable vault. The vault shall have positive drainage with adequate gravity drainage to daylight. Below ground installations with gravity drain to storm drainage systems are NOT acceptable.
 2. The backflow preventer must be installed a minimum distance of 5 (five) feet from the meter service. Installations of backflow preventers within the utility right of way will not be approved.

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3. Vault walls must be constructed with 8" (eight inch cinder blocks or 4" (four inch) concrete. The vault shall be large enough to allow 12" (twelve inches) minimum clearance between the vault walls to each side of the backflow preventer, 12" (twelve inches) minimum clearance between the vault walls on each end of the vault to the inlet and outlet valves of the backflow preventer.
4. The floor of the vault must be gravel with a minimum depth of 24" (twenty-four inches). The distance between the lowest point of the backflow preventer to the surface of the gravel shall be no less than 12" (twelve inches).
5. Backflow preventers must be supported to allow for the weight of the assembly. Support construction can be cinder blocks, bricks, steel, or approved plastic supports. Supports must have a proper 4" (four inch) of concrete footing below the gravel for supports to rest upon. Assembly supports must not interfere with valves, test cocks, testing, and/or repair of the backflow prevention assembly.
6. All piping must be in accordance with the International Plumbing Code.
7. Vault lids must be 1/4" (one-quarter inch) thick deck steel, or approved aluminum and must cover the total outside dimensions of the vault walls, and must also be to the grade of the ground surface or higher. Vault lids shall not exceed 135 (one hundred thirty-five) pounds. Vaults that require large sections of vault lids must be hinged for removal of the lid for access during testing and maintenance of the backflow assembly. Large vault lids must be supported to insure lids will not warp or fall in. Angle iron, 2" x 2" x 1/4", must be used on the bottom of the lids to prevent warping of the vault lids.

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- D.** Requirements of below ground installations of double check valve assembly backflow preventers $\frac{3}{4}$ " (three-quarter inch) through 2" (two inch).
1. The backflow preventer must be installed a minimum distance of 5 (five) feet from the meter service. Installations of backflow preventers within the utility right of way will not be approved.
 2. Double check valve assembly backflow preventers may be installed in plastic boxes provided they are not located in driveways or sidewalks. Enclosures made of cinder blocks with deck steel lids, or approved aluminum, steel boxes, or pre-cast concrete boxes are approved to be used in driveways and sidewalks.
 3. A. Backflow preventers $\frac{3}{4}$ " (three-quarter inch) and 1" (one inch) in size must be installed in an enclosure with a minimum size of 12" (twelve inches) deep, 20" (twenty inches) wide, and 24" (twenty-four inches) long.

B. Backflow preventers 1 $\frac{1}{2}$ " (one and one half inches) and 2" (two inches) in size must be installed in an enclosure with a minimum size of 18" (eighteen inches) deep, 30" (thirty inches) wide, and 40" (forty inches) long.
 4. The backflow preventer must be installed in the center of the enclosure to allow adequate clearance for the testing and/or repair of the backflow prevention assembly.
 5. The floor of the enclosure must be gravel with a minimum depth of 12" (twelve inches). Installations in wet areas will be subject to prior approval and inspection by the Director. The distance between the lowest point of the backflow preventer to the surface of the gravel shall be no less than 6" (six inches).

XII. DEFINITIONS

Definitions in this practice;

"AWWA" mean the American Water Works Association;

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“air gap (AG)” the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture or other device and the flood level rim of the receptacle.

“backflow” pressure created by any means in the water distribution system, which by being in excess of the pressure in the water supply mains causes a potential backflow condition.

“backflow prevention device” a device or means that prevents *backflow*;

“back siphonage” the backflow of potentially contaminated water into the potable water system as a result of the pressure in the potable water system falling below atmospheric pressure of the plumbing fixtures, pools, tanks or vats connected to the potable water distribution piping;

“building” shall have the same meaning as set out in the USBC.

“CCBPP” means cross connection and backflow protection program;

“City” means the City of Harrisonburg and includes its employees, servants and agents;

“cross-connection” any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other either water of unknown or questionable safety or steam, gas or chemical, whereby there exists the possibility for flow from one system to the other, with the direction of flow depending on the pressure differential between the two systems (see *“Backflow”*);

“double check valve assembly (DCVA)” means a backflow prevention device consisting of two force-loaded, independently acting check valves, including tightly closing resilient-seated shutoff valves located at each end of the assembly and fitted with properly located resilient-seated test cocks. This device is designed for use under continuous pressure;

“dual check valve (DuC)” means a backflow prevention device consisting of two independently acting, force-loaded, soft-seated check valves in series. This device does not have a relief port or test cocks. This device is designed for use under continuous pressure;

“dual check valve with atmospheric port (DCAP)” means a backflow prevention device that consists of two independently acting check valves separated by an intermediate chamber with an atmospheric port. A chamber pressure higher than the supply pressure is required to open the port when there is a positive pressure on the supply side. This device is designed for use under continuous pressure;

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“dual check valve with intermediate vent (DuCV)” means a backflow prevention device that consists of two independently acting check valves biased to a normally closed position. Between the check valves there is a relief port that is biased to a normally open position. This device is designed for use under continuous pressure;

“inspector” means any person who is qualified to inspect plumbing systems as defined by the City of Harrisonburg Building Code;

“minor hazard” means any cross-connection or potential cross-connection that constitutes only a nuisance, with no possibility of any health hazard;

“moderate hazard” means any minor hazard that has a low probability of becoming a severe hazard;

“Owner” means any person, firm or corporation having control over property to which this program applied and includes the *owner* registered on the title of the property and any occupant of any *building or structure* located on such property;

“person” means any person, firm or corporation having control over property to which this practice applied and includes the *owner* registered on the title of the property and any occupant of any *building or structure* located on such property;

“potable water” water free from impurities present in amounts sufficient to cause disease or harmful physiological effects and conforming to the bacteriological and chemical quality requirements of the Public Health Service Drinking Water Standards or the regulations of the public health authority having jurisdiction;

“premise isolation” means isolation of the water located within a *building or structure* from the City’s water supply;

“reduced pressure principle assembly (RP)” a backflow prevention device consisting of two independently acting check valves, internally force-loaded to a normally closed position and separated by an intermediate chamber (or zone) in which there is an automatic relief means of venting to the atmosphere, internally loaded to a normally open position between two tightly closing shutoff valves and with a means for testing for tightness of the checks and opening of the relief means;

“severe hazard” means any cross-connection or potential cross-connection involving any substance that could be a danger to health;

“source isolation” means isolation of the water located within or having flowed through a source or potential source of contamination within a *building or structure* including a device, machine, water system or the like, from any *potable water* system;

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“*tester*” means a person who is certified as a tester of backflow prevention devices by Virginia DPOR;

“*USBC*” means the Uniform Statewide Building Code;

“*VMC*” means the Virginia Maintenance Code;

“*vacuum breaker*” a type of backflow preventer installed on openings subject to normal atmospheric pressure that prevents backflow by admitting atmospheric pressure through ports to the discharge side of the device;

“*vacuum breaker, atmospheric type (AVB)*” means a vacuum breaker consisting of a single force-loaded check valve biased to a normally closed position. Downstream of the check valve is a means of automatically venting to atmosphere that is a force-loaded or biased to a normally open position. If there is no flow through the device, the check valve is closed and the vent is open. The device is designed to be under pressure only when water is being drawn from the system and for short, intermittent periods of time;

“*vacuum breaker, pressure type (PVB)*” means an assembly containing an independently acting check valve force-loaded or biased, to a normally closed position, and an independently operating air inlet valve force-loaded or biased to a normally open position and located on the discharge side of the check valve. The assembly is equipped with properly located resilient-seated test cocks and tightly closing resilient-seated shutoff valves located at each end of the assembly. The device is designed for use under continuous pressure;

“*water distribution system*” means an assembly of pipes, fittings, valves and appurtenances that conveys potable water to water supply outlets, fixture, plumbing appliances and devices from the water service pipe or point of entry treatment unit located in the *building*;

“*water meter*” means the water meter installed within a premises to record the amount of water supplied to such premises by the City of Harrisonburg, Public Utilities;

“*water purveyor*” means the City of Harrisonburg, Public Utilities, and includes its employees, acting on its behalf;