

130 CROSS CONNECTION CONTROL

130.01 APPROVED BACKFLOW PREVENTION ASSEMBLIES

130.01.01 Cross-Connection shall mean any unprotected actual or potential connection or structural arrangement between a public or a consumer's water system and any other source or system through which it is possible to introduce any contamination or pollution, other than the intended potable water with which the system is supplied. The following are the approved types of backflow prevention assemblies for use within the Town to prevent backflow into the Town's public potable water distribution system. All backflow prevention devices shall have received approval of their design and construction from either the American Society of Sanitary Engineers (ASSE), the American Water Works Association (AWWA), USC, or the Foundation for Cross Connection Control and Hydraulic Research, whichever is most restrictive. A list of the Approved Manufacturer's is provided in the Appendix.

130.01.01.01 Air gap. An "air gap" is a physical separation between the free-flowing discharge end of a potable water supply pipeline and an open or non-pressure receiving vessel. The separation is the unobstructed vertical distance through 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.

130.01.01.02 Atmospheric Type Vacuum Breaker (AVB). An "atmospheric type vacuum breaker" (also known as the "non-pressure type vacuum breaker") is a device containing a float-check, a check seat, and an air inlet port. The flow of water into the body causes the float to close the air inlet port. When the flow of water stops, the float falls and forms a check valve against back siphonage and at the same time opens the air inlet port to allow air to enter and satisfy the vacuum. A shutoff valve immediately upstream may be an integral part of the device. An atmospheric vacuum breaker is designed to protect against a non-health hazard (isolation protection only) under a back siphonage condition only. The atmospheric vacuum breaker is not designed to protect against back pressure. Based on the design and operation of AVB, the following criteria must be implemented:

130.01.01.02.01 Absolutely no shut-off valves are allowed on the discharge side of the AVB.

130.01.01.02.02 A minimum of six inches of clearance above all downstream piping of the AVB or any overflow rim is required.

130.01.01.02.03 The AVB shall not be under continuous pressure for more than 12 hours.

130.01.01.03 Double-Check Valve Assembly (DCVA). A "double-check valve assembly" is an assembly composed of two (2) independently acting, approved check valves, including tightly closing shut-off valves attached at each end of the assembly and fitted with properly located test cocks. This assembly shall only be used to protect against a non-health hazard (i.e., pollutant).

130.01.01.04 Double-Check-Detector Assembly (DCDA). A “double-check-detector assembly” is a specially designed assembly composed of a line-size approved double-check valve assembly with a specific bypass water meter and a meter-sized approved double-check valve assembly. The meter shall register (in U.S. gallons) accurately for only very low rates of flow and shall show a registration for all rates of flow. This assembly shall only be used to protect against a non-health hazard (i.e., pollutant).

130.01.01.05 Reduced Pressure Principle Backflow Prevention Assembly (RP) is regarded as an assembly that meets the requirements of the AWWA Standard for Reduced-Pressure Principle Backflow Prevention Assembly (AWWA C511-92) or an assembly that has been approved by a laboratory sanctioned by the Conference of State Sanitary Engineers.) A “reduced pressure principle backflow prevention assembly” is an assembly containing within its structure a minimum of two (2) independently acting, approved check valves, together with a hydraulically operating, mechanically independent, pressure differential relief valve located between the check valves and at the same time below the first check valve. The first check valve reduces the supply pressure to a predetermined amount so that during normal flow and at cessation of normal flow, the pressure between the checks shall be less than the supply pressure. In case of leakage of either check valve, the pressure differential relief valve, by discharge to atmosphere, shall operate to maintain the pressure between the checks less than the supply pressure. Since this device discharges to the atmosphere, it can be used where codes call for an air gap. Backflow assemblies installed in a confined space are not recommended. The unit shall include tightly closing shutoff valves located at each end of the assembly and each assembly shall be fitted with properly located test cocks. The assembly is designed to protect against a health hazard (i.e., contaminant). The AWWA Standard for Reduced-Pressure Principle Backflow Prevention Assembly (C511) details the requirements for design, materials of construction, and operation of the devices in all sizes. AWWA Manual M14 provides guidelines for the operation of double-check valves and reduced-pressure principle devices.

130.01.01.06 Reduced Pressure Principle-Detector Assembly (RPDA). A “reduced pressure principle-detector assembly” is a specially designed assembly composed of a line-size approved reduced pressure principle backflow prevention assembly with a specific bypass water meter and a meter-sized approved reduced pressure principle backflow prevention assembly. The meter shall register (in U.S. gallons) accurately for only very low rates of flow and shall show a registration for all rates of flow. This assembly shall be used to protect against health hazard (i.e., contaminant).

130.01.01.07 Pressure Type Vacuum Breaker (PVB). A “pressure type vacuum breaker” is an assembly containing an independently operating internally loaded check valve and an independently operating loaded air inlet valve located on the discharge side of the check valve. The assembly is to be equipped with properly located test cocks and tightly closing shutoff valves attached at each end of the assembly. The PVB, unlike the atmospheric vacuum breaker, can be tested. The PVB protects against non-health hazards or health hazards under backsiphonage only. The pressure vacuum breaker is not designed to protect against back pressure. Based on the design and operation of PVB, the following criteria must be implemented:

130.01.01.07.01 Shut-off valves may be installed on the downstream of PVB.

130.01.01.07.02 A minimum clearance of 12 inches above all downstream piping must be established.

130.01.01.08 Residential Dual Check (RDC). A “residential dual check valve” is an assembly, without test cocks or ports, containing two independently operating spring loaded, poppet type check valves, in series, which can be easily removed and replaced. This assembly is suitable for installation in a water meter vault or pit, below ground.

130.02 INSTALLATION OF ASSEMBLIES

130.02.01 All new construction plans and specifications, when required by these Standard Specifications, or by the North Carolina Building Code, to have cross connection control devices, shall be made available to the Town for review and approval and to determine the degree of hazard.

130.02.02 All backflow prevention assemblies shall be installed in accordance with these Standard Specifications and/or in the latest edition of the North Carolina Building Code, whichever is most restrictive. In addition, all backflow prevention assemblies shall be installed in accordance with the manufacturer’s instructions. In the event of a conflict between a manufacturer’s instructions for installation and the North Carolina Building Code, the North Carolina Building Code shall prevail. In the event of a conflict between these Specification and a manufacturer’s instructions for installation, these Specifications shall prevail, unless judged otherwise by the Public Utilities Director.

130.02.03 All backflow prevention assemblies connected to piping 2 ½ inches in diameter or larger shall be provided with gate valves on each side of the backflow prevention assembly. Each of these gate valves shall be operated by an outside screw and yoke assembly with a hand wheel. Non rising stem gate valves shall not be accepted.

130.02.04 All double-check valve assemblies shall be installed in a location in which no portion of the assembly can become submerged in any substance under any circumstance. Positive drainage is required if it is placed below grade. Double-check valve assemblies may be installed in a vertical position with prior approval from the Town, provided the flow of water is in an upward direction.

130.02.05 Reduced pressure principle backflow prevention assemblies shall be installed in a horizontal position and in a location in which no portion of the assembly can become submerged in any substance under any circumstance. Pit and/or below grade installations are prohibited.

130.02.06 All backflow prevention assemblies installed out of doors shall be provided with a weatherproof enclosure capable of preventing freezing of these backflow prevention assemblies and any related valves and piping.

130.02.07 When it is not possible to interrupt water service, provisions shall be made for a parallel installation of backflow prevention assemblies. Unprotected bypasses around a

backflow preventer are unacceptable. All water meter bypasses shall be locked, tagged and the tag dated with the last date that it was secured.

130.02.08 In the event of a conflict between a manufacturer's instructions for installation and the North Carolina Building Code, the North Carolina Building Code shall prevail. In the event of a conflict between these Specification and a manufacturer's instructions for installation, these Specifications shall prevail, unless judged otherwise by the Director of Public Utilities.

130.03 FACILITIES REQUIRING PROTECTION

130.03.01 The Town has identified the types of facilities and/or services having potential for backflow of non-potable water into the public potable water distribution system. Those types of facilities requiring approved backflow prevention assemblies and the type of approved backflow prevention device required are listed in Table 130.01. Other types of facilities or services not listed in the list may also be required to install approved backflow prevention assemblies, if determined necessary by the Town. All assemblies and installations shall be subject to inspection and approval by the Town.

130.04 TESTING AND TEST EQUIPMENT

130.04.01 The Owner/Developer is responsible to make sure a backflow prevention assembly is working properly upon installation. The Owner/Developer shall, at his own expense, conduct testing of a backflow prevention assembly. Tests shall be conducted within ten (10) days of installation, and annually thereafter, or at a higher frequency if so determined by the Town. Residential backflow prevention devices less than 1" will only require testing upon request of the Utilities department if there is evidence that the device is not functioning properly. The testing shall be recorded on a "Backflow Prevention Assembly Test Form" as provided in the Appendix, and shall be certified by a Certified Backflow Prevention Assembly Technician. The Owner/Developer shall maintain a record of all the test reports and repairs, and shall send a copy of each test report to the Town within thirty (30) days after the completion of each test.

130.04.02 Below is a list of the types of assemblies that require testing.

130.04.02.01 Double-check-detector assembly (DCDA)

130.04.02.02 Double-check valve assembly (DCVA)

130.04.02.03 Pressure vacuum breaker (PVB)

130.04.02.04 Reduced pressure principle detector assembly (RPDA)

130.04.02.05 Reduced pressure principle backflow preventer assembly (RP)

130.04.03 All Certified Backflow Prevention Assembly Technicians shall obtain and employ backflow prevention assembly test equipment, which has been evaluated and/or approved by the Town. All test equipment shall be registered with the Town and shall be checked for accuracy annually (at a minimum), calibrated if necessary, and certified to the Town as to such accuracy/calibration, employing a calibration method acceptable to the Town.

Table 130.01 – Required approved backflow prevention devices for various facilities

Type of Facility	Type of Device
Automotive Services Stations, Dealerships, etc.	
No Health Hazard	DCVA
Health Hazard	RP
Auxiliary Water Systems	
Approved Public/Private Water Supply	DCVA
Unapproved Public/Private Water Supply	RP
Used Water and Industrial Fluids	RP
Bakeries	
No Health Hazard	DCVA
Health Hazard	RP
Beauty Shops/Barber Shops	
No Health Hazard	DCVA
Health Hazard	RP
Beverage Bottling Plants	RP
Breweries, Wineries, Distilleries	RP
Buildings - Hotels, apartment houses, offices, public and private buildings, or other structures having unprotected cross connections	
(Under three stories) No Health Hazard	DCVA
(Under three stories) Health Hazard	RP
(Over three stories) All	RP
Canneries, packing houses, and rendering plants	RP
Church	
w/o Kitchen	DCVA
w/ Kitchen	RP
Commercial car wash facilities	RP
Commercial greenhouses	RP
Commercial sales establishments (department stores, malls, etc.)	
No Health Hazard	DCVA
Health Hazard	RP
Concrete/asphalt plants	RP
Dairies and cold storage plants	RP
Dye works	RP
Film laboratories	RP

Table 130.01 – Required approved backflow prevention devices for various facilities

Fire Systems - ¾-inch to 2-inch	
No Health Hazard (pumped potable water w/ no additions)	DCDA
Health Hazard: (pumped from non-potable sources or containing additives such as foam or antifreeze)	RP
Fire Systems - 2 ½-inch to 10-inch or larger	
No Health Hazard (pumped potable water w/ no additions)	DCDA
Health Hazard: (pumped from non-potable sources or containing additives such as foam or antifreeze)	RPDA
Grocery Stores	RP
Hospitals, medical buildings, sanitariums, morgues, mortuaries, autopsy facilities, nursing and convalescent homes, medical clinics, dentists, and veterinary hospitals	RP
Laundries	
No Health Hazard	DCVA
Health Hazard (i.e., Dry Cleaners)	RP
Lawn irrigation systems (split taps)	RP
Metal manufacturing, cleaning, processing, and fabricating plants	RP
Mobile home parks	
No Health Hazard	DCVA
Health Hazard	RP
Oil and gas sales (bulk wholesale, or retail) distribution, production, storage or transmission properties	RP
Pest control (exterminating and fumigating)	RP
Power plants (electrical)	RP
Restaurants	
No Health Hazard (prepackaged foods and no dishwasher)	DCVA
Health Hazard	RP
Residential (single family homes and individually metered dwelling units of the following types of multi-family dwellings: duplexes, triplexes, multiplexes, apartments, townhouses, condominiums)	RDC
Restricted, classified, or other closed facilities	RP
Sand and gravel plants	RP
Schools and colleges	RP
Sewage and storm drain facilities	RP
Swimming Pools	RP
Waterfront facilities and industries	RP

Table 130.01 – Required approved backflow prevention devices for various facilities

Abbreviations used above:

DCVA = Double-Check Valve Assembly

DCDA = Double-Check Detector Assembly

RP = Reduced Pressure Principle Assembly

RPDA = Reduced Pressure Detector Assembly

RDC = Residential Dual Check