



CROSS-CONNECTION CONTROL PROGRAM



WATER AND SEWERAGE SYSTEM POLICY RESOLUTIONS
City of Winston-Salem / Forsyth County
North Carolina

February 2016

This publication shall supersede all previous publications effective February 03, 2016.

Part A – Water System Policy Resolution

Sec. 52. - Connections for fire sprinkler and in-ground irrigation systems.

- (a) All connections for fire sprinkler and in-ground irrigation systems which are now or hereafter connected with the water system, shall be made with an approved backflow preventer commensurate with the degree of hazard, in accordance with specifications furnished by the director or under the director's supervision.
- (b) All new connections for in-ground irrigation systems which are connected after June 30, 2009 with the water system, shall be made to an individual meter for this service alone, in accordance with requirements outlined in N.C.G.S. Chapter 143-355.4 labeled "Water System Efficiency."
- (c) Any connections which do not comply with the aforesaid requirements shall immediately be made to conform thereto.
- (d) No water passing through the connection made for providing service to operate the fire sprinkler system or in-ground irrigation system shall be used for any purpose other than to operate the fire sprinkler system or in-ground irrigation system.
- (e) In any event of the failure of any person to comply with any of the provisions of this section, the city, after complying with Section 16 of this resolution, shall disconnect the premises of such person from the water system.

Sec. 53. - Cross-connection, backflow and back-siphonage control.

(a) Intent, purpose and control.

(1) It is the intent of this section to recognize that there are varying degrees of hazard to potable water within the water main and water supply systems. It is also the intent to apply the principle that the degree of protection should be commensurate with the degree of hazard.

(2) The purpose of this section is:

a. To protect the public potable water supply of the City of Winston-Salem against actual or potential cross-connections, backflow and back-siphonage by isolating, within the premises or private property, contamination or pollution that has occurred or may occur because of some undiscovered or unauthorized cross-connection on the premises or private property.

b. To eliminate cross-connections, backflow and back-siphonage or any other source of water or process water used for any purpose whatsoever which may jeopardize the safety of the public potable water supply of the City of Winston-Salem.

c. To establish a cross-connection, backflow and back-siphonage control program.

(3) Cross connections, backflow and back-siphonage control require cooperation between the City of Winston-Salem and the consumer. The responsibilities and duties of each shall be as set forth in this Section and other applicable regulations.

(b) Responsibilities; enforcement.

(1) The city/county utility commission is primarily responsible for the prevention of contamination and pollution of the public water system. Such responsibility begins at the point of origin of the public water supply and includes all of the public water distribution system, and ends at the service connection to the consumer's water system. In addition, the commission shall exercise reasonable vigilance to ensure that the consumer has taken the proper steps to protect the public potable water system. When it is determined that a backflow protection device is required for the protection of the public system of the City of Winston-Salem, the commission shall require the consumer, at the consumer's expense, to install an approved backflow prevention device at each service connection. Water service may be withheld until installation is approved and finalized. A forty dollar (\$40.00) fee may be imposed for excess inspection trips in excess of two (2) per device.

(2) The consumer has the prime responsibility of preventing contaminants and pollutants from entering his potable water system or the public water system at his service connection. The consumer, at his own expense, shall install, operate, test, repair and maintain approved backflow prevention device(s) at the service connection(s) as directed by the City of Winston-Salem.

(3) Enforcement of this section shall be administered by the director of public works utilizing the staff of the utilities and inspections division and the cooperation of the environmental health division of the Forsyth County Health Department.

(4) The utilities division reserves the right to interrupt service for tests, maintenance, and repairs. The utilities division shall schedule any interruption of service with the consumer, except in cases of emergency. In these cases, the consumer shall be notified immediately of the emergency situation and the intended interruption of service.

(c) *Definitions.*

(1) *Air-gap separation* means 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. An "approved air-gap separation" shall be at least double the diameter of the supply pipe measured vertically above the top rim of the vessel. In no case shall the gap be less than one (1) inch.

(2) *Approved.* The term "approved" as used herein in reference to a water supply system or backflow prevention device (or method) shall mean one that has been approved by the commission.

(3) *Backflow prevention device, type* means any effective device, method or construction used to prevent backflow into a potable water system. The type of device used shall be based on the degree of hazard either existing or potential.

(4) *Back-pressure backflow* means backflow caused by a pump, elevated tank, boiler or other means that could create pressure within the system greater than the supply pressure.

(5) *Back-siphonage backflow* is a reversal of the normal direction of flow in the pipeline due to a negative pressure (vacuum) being created in the supply line with the backflow source subject to atmospheric pressure.

(6) *Certified tester* means a person who has proven his/her competency to test, repair, overhaul and prepare reports on cross-connection control devices as evidenced by certification of successful completion of a training program approved by the director.

(7) *Check valve, approved* means a check valve that is drip tight in the normal direction of flow when the inlet pressure is one (1) psi and the outlet pressure is zero (0). The check valve shall permit no leakage in a direction reversed to the normal flow. The closure element (e.g., clapper) shall be internally weighted or otherwise internally loaded to promote rapid and positive closure.

(8) *Consumer* means any person, firm or corporation using or receiving water from the City of Winston-Salem water system.

(9) *Contamination* shall mean an impairment of the quality of the water by sewerage or industrial fluids or waste to a degree which creates a actual hazard to the public health through poisoning or through the spread of disease.

(10) *Cross-connection* means any actual or potential connection or structural arrangement between a public or a consumer's potable water system and any other source or system through which it is possible to introduce into any part of the potable water system any used water, industrial fluid, gas or substance other than the intended potable water with which the system is supplied. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices and other temporary or permanent devices through which or because of which backflow can or may occur are considered to be cross-connections.

(11)*Cross-connection, point of* means the specific point or location in a public or consumer's potable water system where a cross-connection exists.

(12)*Double-check valve assembly* means an assembly composed of two (2) single, independently acting, approved check valves, including tightly closing shutoff valves located at each end of the assembly and suitable connections for testing the water tightness of each check valve.

(13)*Hazard, degree of*. The term "degree of hazard" shall be derived from the evaluation of a health, system, plumbing or pollutional hazard.

(14)*Hazard, health* means an actual or potential threat of contamination or pollution of a physical or toxic nature to the public potable water system or the consumer's potable water system to such a degree or intensity that there would be a danger to health.

(15)*Hazard, plumbing* means a plumbing-type cross-connection in a consumer's potable water system that has not been properly protected by a vacuum breaker, air-gap separation or other device. Unprotected plumbing-type cross-connections are considered to be a health hazard. They include, but are not limited to, cross-connections to toilets, sinks, lavatories, wash trays, domestic washing machines, fire sprinklers and lawn sprinkling systems. Plumbing-type cross-connections can be located in many types of structure, including homes, apartment houses, hotels and commercial and industrial establishments.

(16)*Hazard, pollution* means an actual or potential threat to the physical properties of the water system or the potability of the public or the consumer's potable water system but which would not constitute a health or system hazard, as defined. The maximum degree or intensity of pollution to which the potable water system could be degraded under this definition would cause a nuisance or be aesthetically objectionable or could cause minor damage to the system or its appurtenances.

(17)*Hazard, system* means an actual or potential threat of sever danger to the physical properties of the public or the consumers potable water system or of a pollution or contamination which would have a protracted effect on the quality of the potable water in the system.

(18)*Industrial fluids* means any fluid or solution which may be chemically, biologically or otherwise contaminated or polluted in a form or concentration such as would constitute a health, system, pollutional or plumbing hazard if introduced into an approved supply. This may include, but not be limited to, polluted or contaminated used waters; all types of processed waters and "used waters" originating from the public potable water system which may deteriorate in sanitary quality; chemicals in fluid form; plating acids and alkalis; circulating cooling waters connected to an open cooling tower and/or cooling waters that are chemically or biologically treated or stabilized with toxic substances; contaminated natural waters such as from wells, springs, streams, rivers, irrigation canals or systems, etc.; oils, gases, glycerine, paraffin, caustic and acid solutions and other liquid and gaseous fluids used in industrial or other processes or for firefighting purposes.

(19)*Industrial piping system, consumer's* means any system used by the consumer for transmission of or to confine or store any fluid, solid or gaseous substance other than an approved water supply. Such a system would include all pipes, conduits, tanks, receptacles, fixtures, equipment and appurtenances used to produce, convey or store substances which are or may be polluted or contaminated.

(20)*Pollution* means an impairment of the quality of the water to a degree which does not create an actual hazard to the public health but which does adversely and unreasonably affect such waters for domestic use.

(21)*Reduced-pressure principle backflow prevention device* means a device containing within its structure a minimum of two (2) independently acting, approved check valves, together with an automatically operating pressure differential relief valve located between the two (2) check valves. The first check valve reduces the supply pressure 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 differential relief valve, by discharging to the atmosphere, shall

operate to maintain the pressure between the checks less than the supply pressure. The unit shall include tightly closing shutoff valves located at each end of the device and each device shall be fitted with properly located test cocks.

(22)*Service connection* means the terminal end of a service connection from the public potable water system, i.e., where the commission loses jurisdiction and sanitary control over the water at its point of delivery to the consumer's water. If a meter is installed at the end of the service connection, then the service connection shall mean the downstream end of the meter. There should be no unprotected takeoffs from the service line ahead of any meter or backflow prevention device located at the point of delivery to the consumer's water system.

(23)*Water, potable* means water from any source which has been investigated by the health agency having jurisdiction, and which has been approved for human consumption.

(24)*Water supply, auxiliary* means any water supply on or available to the premises other than the City of Winston-Salem's approved public potable water supply. These auxiliary waters may include water from another purveyor's public potable water supply or any natural source such as a well, spring, river, stream, etc., or used waters or industrial fluids. They may be polluted or contaminated or they may be objectional and constitute an unacceptable water source over which the commission does not have sanitary control.

(25)*Water system, consumer's* includes any water system located on the consumer's premises, whether supplied by a public potable water system or an auxiliary water supply. The system or systems may be either a potable water system or an industrial piping system.

(26)*Water system, consumer's potable* means that portion of the privately owned potable water system lying between the service connection and the point of use. This system will include all pipes, conduits, tanks, receptacles, fixtures, equipment and appurtenances used to produce, convey, store or use potable water.

(27)*Water system, public potable* means any publicly or privately owned water system operated as a public utility under a valid health permit to supply water for domestic purposes. This system will include all sources, facilities and appurtenances, between the source and the service connection such as valves, pumps, pipes, conduits, tanks, receptacles, fixtures, equipment and appurtenances used to produce, convey, treat or store potable water for public consumption or use.

(28)*Water, used* means any water supplied by a water purveyor from a public potable water system to a consumer's water system after it has passed through the service connection and is no longer under the control of the water purveyor.

(d) *Regulations.*

(1) No water service connections to any premises shall be installed or maintained unless the potable water and water supply are protected against actual or potential contamination or pollution in the manner required.

(2) In the event of contamination or pollution of a potable water system, the consumer shall notify the commission immediately in order that appropriate measures may be taken to overcome the contamination or pollution.

(3) The director or his authorized representative shall have the right to enter any building, structure or premises to perform any duty imposed upon him by this section where cross-connection, backflow and back-siphonage are deemed possible.

(4) Nothing herein shall relieve the consumer of the responsibility for conduction or causing to be conducted periodic surveys of water use practices on his premises to determine whether there are actual or potential cross-connections in the consumer's water system through which contaminants or pollutants could flow back into the public water system.

(5) On request, the consumer shall furnish to the commission any pertinent information regarding the water supply system on such property where cross-connection, backflow and back-siphonage are deemed possible.

(6) Water service may be discontinued after reasonable notice to the consumer if a violation of this section exists on the premises, and such other precautionary measures may be taken as are deemed necessary to eliminate any danger to the potable water system. Water service shall not be restored until the danger has been eliminated in compliance with the provisions of this section.

(7) Installation of all cross-connection, backflow and back-siphonage control devices shall be made by a North Carolina licensed plumbing or utility contractor, as determined by application and approved by the City of Winston-Salem.

(8) All cross-connection, backflow and back-siphonage control equipment shall meet the testing requirements of the USC Foundation for Cross-Connection Control and Hydraulic Research, The American Water Works Association and the North Carolina State Building Code, Volume II, Plumbing, and the U.S. EPA.

(9) All cross-connection, backflow and back-siphonage control devices, both existing and new, and all parts thereof shall be maintained in a safe condition and in good working order. The consumer shall be responsible for the maintenance of all backflow prevention devices downstream from the service connection on the private water system. All backflow prevention devices located at the service connection shall be tested at least once a year, or more often in those instances where inspections by the department of public works indicate a need. All rubber goods shall be replaced after a failing test occurs, or more often if needed. All testing, maintenance and repairs shall be made by a certified tester approved by the department of public works, at the expense of the consumer.

(e) Industrial plants or facilities; backflow protection at the service connection usual requirements and methods of correction.

Abbreviations. The following abbreviations have been adopted describing devices and methods used to control cross-connection at the service connection:

- Air gap - A.G.
- Reduced pressure backflow device - RPD
- Double check valve assembly - D.C.A.
- Reduced pressure detector assembly - R.P.D.A.
- Double check detector assembly - D.C.D.A.

(1) Auxiliary water systems:

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| a. Potentially contaminated source | A.G. or R.P.D. |
| b. Potable but not acceptable as supplemental source for the public water system | D.C.A. |
| c. Approved source supplemental to the public potable water system | None |

(2) Beverage bottling plants

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| a. Subject to back pressure | A.G. or R.P.D. |
| b. Not subject to back pressure | D.C.A. |

(3) Breweries

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| a. Subject to back pressure | A.G. or R.P.D. |
| b. Not subject to back pressure | D.C.A. |

(4) Buildings—Hotels, apartment houses, public and private buildings or other structures:	
a. Major health hazard exists	A.G. or R.P.D.
b. Minor health hazard exists	D.C.A.
(5) Canneries, packing houses and reduction plants	A.G. or R.P.D.
(6) Chemical plants—Manufacturing processing, compounds or treatment	A.G. or R.P.D.
(7) Chemically contaminated water systems	A.G. or R.P.D.
(8) Civil works:	
a. Health hazard exists	A.G. or R.P.D.
b. No health hazard	D.C.A.
(9) Dairies and cold storage plants:	
a. Health hazard exists	A.G. or R.P.D.
b. No health hazard	D.C.A.
(10) Film laboratories	A.G. or R.P.D.
(11) Fire systems:	
a. Health hazard exists	R.P.D.A.
b. No health hazard exists	D.C.D.A.
c. Systems with fire department connection (FDC)	R.P.D.A.
(12) Hospitals, medical buildings, sanitariums, morgues, mortuaries, autopsy facilities:	A.G. or R.P.D.
a. Nursing and convalescent homes and clinics (single-story)	D.C.A.
(13) Irrigation systems	R.P.D.
(14) Laundries and dye works	A.G. or R.P.D.
(15) Metal manufacturing, cleaning processing and fabricating plants:	
a. Health hazard exists	A.G. or R.P.D.
b. No health hazard	D.C.A.
(16) Paper and paper products plants	A.G. or R.P.D.
(17) Plating plants	A.G. or R.P.D.

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| (18) Power plants | A.G. or R.P.D. |
| (19) Radioactive materials or substances, plants or facilities handling | A.G. or R.P.D. |
| (20) Restricted, classified or other closed facilities | A.G. or R.P.D. |
| (21) Sand, concrete and gravel plants | A.G. or R.P.D. |
| (22) Schools and colleges | A.G. or R.P.D. |
| (23) Sewage and storm drain facilities | A.G. or R.P.D. |

Sec. 54. - Cross-connection with source other than city prohibited.

(a) When any property is connected to a city water line, and the property owner continues to have a well or other source of water, it shall be unlawful for the plumbing servicing any building upon such property to be so connected that any water outlet within the building may be served with water from any source other than the city connection, and it shall also be unlawful to have plumbing cross-connected or so installed that water from the city water system or the private water system may in any way become intermingled. Such cross-connections may result in removal of the meter supplying such connections, as well as other penalties, civil or criminal, provided by law.

(b) Upon discovery of a cross-connection upon any property being furnished water through the city water system, the owner of the property shall be notified that the cross-connection must be discontinued within thirty (30) days and that a failure to remove or correct the cross-connections within thirty (30) days will result in removal of the meter. If the correction is not made within the thirty-day period, the meter shall be removed and shall not be reinstalled without payment of the remainder of the capital charge, unless it has previously been paid, in which case a ten-dollar charge will be required.