

ARTICLE V

Backflow Prevention Devices

Sec. 13-5-10. Legislative intent.

It is the intent of the City Council by this Article to protect the municipal water system from contamination or pollution by backflow from an owner's internal distribution system or private water system, and to provide for the maintenance of a continuing program of cross-connection control, which will systematically prevent the contamination of the municipal water supply system. It is further the intention of the City Council to comply with state law and Section 11.1.2 of the Colorado Primary Drinking Water Regulations, as promulgated and approved by the Colorado Department of Public Health and Environment. (Prior code 10.14.010; Ord. 4 §1, 2005)

Sec. 13-5-20. Responsibility.

(a) The City Manager is hereby delegated the responsibility to implement a cross-connection control program in accordance with this Article, and for the enforcement thereof. If a backflow prevention device is required at the City water service connection to any owner's premises for the protection of the municipal water system, the City Manager shall give notice in writing to the owner to install an approved backflow prevention device at each service connection to the premises. The owner shall install an approved device or devices at the owner's own expense.

(b) No provision of this Article exempts the owner from the cross-connection control provisions for internal water distribution systems as contained in the Plumbing Code, which has previously been adopted by reference. (Prior code 10.14.020; Ord. 4 §1, 2005)

Sec. 13-5-30. Definitions.

Unless the context specifically indicates otherwise, the meanings of terms used in the Article shall be as follows:

Air-gap means the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supply water to a tank, plumbing fixture or other device and the flood level rim of the vessel. An approved air-gap shall be at least double the diameter of the supply pipe, measured vertically, above the flood level rim of the vessel and, in no case, less than one (1) inch. When an air-gap is used at the service connection to prevent the contamination or pollution of the public potable water system, an emergency bypass shall be installed around the air-gap system and an approved reduced pressure principal device shall be installed in the bypass system.

Approved means accepted by the utility as meeting the applicable specifications stated or cited in this Article, or as suitable for the proposed use.

Auxiliary water supply means any water supply on or available to the premises other than the City'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, pond, lake, etc., or *used waters* or *industrial fluids*. These waters may be polluted or contaminated or

may be objectionable and constitute an unacceptable water source over which the utility does not have sanitary control.

Backflow means the undesirable reversal of the direction of flow of the water or mixtures of water and other liquid, gases or other substances into the distribution pipes of the potable water supply system from any source caused by backpressure and/or backsiphonage.

Backflow prevention device means any device, method or type of construction designed to prevent backflow or backsiphonage into the public water supply by isolating the owner's water system from the public water system.

Backpressure means backflow caused by a pump, elevated tank, boiler or means that could create an elevated pressure within the nonpotable system greater than the supply pressure.

Backsiphonage means the flow of water or other liquids, mixtures or substances into the distribution pipes of a potable water supply system from any source other than its intended source caused by negative or subatmospheric pressure in the potable water supply system.

Certified tester means a person who has passed an approved testing course and who is listed by the City as a certified tester.

Check valve means a self-closing device which is designed to permit the flow of fluids in one (1) direction and to close if there is a reversal of flow.

Colorado Department of Health Cross Connection Control Manual means a manual that has been published by the State addressing cross-connection control practices which will be used as a guidance document for the utility in implementing a cross-connection control program as outlined in Section 13-5-20 above.

Contamination means an impairment of the quality of the potable water by sewage, industrial fluids, waste liquids, compounds or other materials to a degree which creates an actual hazard to the public health through poisoning or through the spread of disease.

Critical level means the critical level (C-L or C/L) marking on a backflow prevention device or vacuum breaker which is a point conforming to approved standards and established by the testing laboratory (usually stamped on the device by the manufacturer), which determines the minimum elevation above the flood-level rim of the fixture, highest point of usage, or receptacle served at which the device may be installed. When a backflow prevention device does not bear a critical level marking, the bottom of the vacuum breaker, combination valve or any such approved device shall constitute the *critical level*.

Cross-connection means any physical arrangement whereby a public water supply is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture or other device which contains or may contain contaminated water, sewage or other waste or liquid of unknown or unsafe quality which may be capable of imparting contamination to the public water supply as a result of backflow. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices, four-way valve connections and other

temporary or permanent devices through which, or because of which, backflow would occur are considered to be cross-connections.

Cross-connections, controlled means a connection between a potable water system and a nonpotable water system with an approved backflow prevention device properly installed that will continuously afford the protection commensurate with the degree of hazard.

Double check valve assembly means an assembly of two (2) independently operating approved check valves with tightly closing shut-off valves on each side of the check valves, plus properly located test cocks for the testing of each check valve. The entire assembly shall meet the design and performance specifications and approval of a recognized and utility-approved testing establishment for backflow prevention devices. To be approved, these devices must be readily accessible for in-line maintenance and testing and be installed where no part of the device will be submerged.

Flood-level rim means the edge of the receptacle from which liquid overflows.

Hazard, degree of means the term is derived from an evaluation of the potential risk to public health and the adverse effect of the hazard upon the potable water system.

Hazard, health means any condition, device or practice in the water supply system and its operation which could create or, in the judgment of the City Manager, may create, a danger to the health and well-being of the water consumer. An example of a health hazard is a structural defect, including cross-connections, in a water supply system, or a direct connection of a potable water supply line to a sanitary sewer.

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 backflow prevention device. Unprotected plumbing type cross-connections are considered to be a health hazard.

Hazard, pollutional means an actual or potential threat to the physical properties of the water system or to the potability of the public *potable water system* or the consumer's potable water system, but which would constitute a nuisance or be aesthetically objectionable or could cause damage to the system or its appurtenances, but would not be dangerous to health.

Hazard, system means an actual or potential threat of severe damage to the physical properties of the public potable water system or the consumer's 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.

Industrial fluids system means any system containing a fluid or solution which may be chemically, biologically or otherwise contaminated or polluted in a system, pollutional or plumbing hazard if introduced into an approved water supply. This may include, but not be limited to: polluted or contaminated waters; all types of process waters and *used waters* originated from the public potable water system which may have deteriorated in sanitary quality; chemicals in fluid form; plating acids and alkalies, circulated cooling waters connected to an open cooling tower and/or cooling towers that are chemically or biologically treated or stabilized with toxic substances; contaminated natural waters such as from wells, springs, streams, rivers, lakes, dams, ponds, retention pits, irrigation canals, systems, etc.; oils, gases, glycerine, paraffins, caustic and acid solutions and other liquid and gaseous fluids used in industrial or other purposes or for fire-fighting purposes.

Nonpotable water means water that is not safe for human consumption or that is of questionable quality.

Pollution means the presence of any foreign substance (organic, inorganic, radiological or biological) in the water that may degrade the water quality so as to constitute a hazard or impair the water's usefulness.

Potable water means water free from impurities in amounts sufficient to cause disease or harmful physiological effects. The bacteriological, chemical and radiological quality shall conform with State of Colorado Primary Drinking Water Regulations.

Reduced pressure principal device means an assembly of two (2) independently operating approved check valves with an automatically operating differential relief valve between the two (2) check valves, tightly closing shut-off valves on either side of the check valves, plus properly located test cocks for the testing of the check and relief valves. The entire assembly shall meet the design and performance specifications and approval of a recognized and utility-approved testing agency for backflow prevention assemblies. The device shall operate to maintain the pressure in the zone between the two (2) check valves at a level less than the pressure on the public water supply side of the device. At cessation of normal flow, the pressure between the two (2) check valves shall be less than the pressure on the public water supply side of the device. In case of leakage of either of the check valves, the differential relief valve shall operate to maintain the reduced pressure in the zone between the check valves by discharging to the atmosphere. To be approved, these devices must be readily accessible for in-line maintenance and testing and be installed in a location where no part of the device will be submerged.

Submerged inlet means a water pipe or extension thereto from a public water supply terminating below the flood level rim in a tank, vessel, fixture or appliance which may contain water of questionable quality, waste or other contaminant, and which is unprotected against backflow.

Utility means the City Water Utility and is vested with the authority and responsibility for the enactment and enforcement of this Article.

Vacuum means any pressure less than that exerted by the atmosphere.

Vacuum breaker, atmospheric nonpressure type means a vacuum breaker consisting of an air inlet opening and a nonloaded check disk valve designed to prevent backsiphonage only. The device shall not be subjected to continuous static line pressure or backpressure or be installed where it would be under pressure for more than twelve (12) hours in any twenty-four-hour period.

Water-service connection means the terminal end of the City's service; i.e., where the City loses jurisdiction and sanitary control over the water at its point of delivery to the customer's stop box or shut-off valve or meter, whichever comes first from the utility water main. If a meter is installed at the end of the service connection, *service connection* shall mean the downstream end of the meter. There shall be no unprotected take-offs from the service line ahead of any meter or backflow prevention device located at the point of delivery to the customer's water system. *Service connection* shall also include water service connection from a fire hydrant and all other temporary or emergency water service connections from the public potable water system. For customers outside the City limits,

water service connection means the terminal end of the City's service connection from the public potable water system to the customer's corporation stop. (Prior code 10.14.030; Ord. 4 §1, 2005)

Sec. 13-5-40. Water system.

The municipal water system shall consist of the source and distribution facilities of the water system to the point of the owner's system. The source shall include all components of the facilities utilized in the production, treatment, storage and delivery of water to the distribution system. The distribution system shall include the network of conduits used for the delivery of water from the source to the owner's system. The owner's system shall begin at the water service connection. (Prior code 10.14.040)

Sec. 13-5-50. Installation of backflow devices.

(a) An approved backflow prevention device shall be installed at or near the property line or immediately inside the structure being served; but in all cases, before the first branch line leading off the service line wherever the following conditions exist:

(1) In the case of premises having an auxiliary water supply which is not or may not be of safe bacteriological or chemical quality and which is not acceptable as an additional source by the City Manager, the public water system shall be protected against backflow from the premises by installing a backflow prevention device in the service line appropriate to the degree of hazard.

(2) In the case of premises in which any industrial fluids or any other objectionable substance is handled in such a fashion as to create an actual or potential hazard to the public water system, the public water system shall be protected against backflow from the premises by installing a backflow prevention device in the service line appropriate to the degree of hazard. This shall include the handling of process waters and waters originating from the public water system which have been subject to deterioration in quality.

(3) In the case of premises having internal cross-connections that cannot be permanently corrected and controlled or having intricate plumbing and piping arrangements, or where entry to all portions of the premises is not readily accessible for inspection purposes, making it impossible or impractical to ascertain whether or not dangerous cross-connections exist, the public water system shall be protected against backflow from the premises by installing a backflow prevention device in the service line.

(b) Backflow prevention devices are to be installed in an accessible location to facilitate inspection, testing and maintenance. Adequate drainage area for the device must be provided for in the event that water is released. (Prior code 10.14.050)

Sec. 13-5-60. Inspections, testing and repair.

It is the responsibility of the owner to have certified inspections and operational tests made on the backflow prevention device upon installation and at least once per year thereafter. The City Manager may require certified inspections at more frequent intervals. These inspections shall be made at the expense of the owner and shall be performed by certified City personnel or by a certified inspector approved by the City Manager. A backflow prevention device shall be repaired or replaced at the expense of the owner whenever a device is found to be defective. (Prior code 10.14.060; Ord. 4 §1, 2005)

Sec. 13-5-70. Reporting and recordkeeping.

The certified inspector shall report, on the form prescribed by the City, the results of inspections, tests and maintenance to the City Manager and the water owner. This report shall be submitted to the City Manager within ten (10) days following the completion of the inspection, test or maintenance of the device. The certified inspector shall also, on the form prescribed by the City, attach a card to the backflow prevention device following such inspection, test or maintenance activity to document and date the activities performed. Records of all inspections, tests or maintenance activities, including materials and parts changed, shall be kept by the certified inspector and the owner. (Prior code 10.14.070)

Sec. 13-5-80. Types of backflow prevention devices.

The type of protective device required shall depend upon the degree of hazard which exists, as determined by the City Manager, based upon the following general guidelines. In making this determination, the City Manager may utilize charts and criteria established by other municipalities in the State in implementing a cross-connection control program. The guidelines referred to in this Article are as follows:

(1) In the case of any premises where there is an auxiliary water supply and it is not subject to any of the following rules, the municipal water system shall be protected by an approved air-gap separation or an approved reduced pressure principal backflow prevention device.

(2) In the case of any premises where there is water or any substance that would be objectionable but not hazardous to health if introduced into the municipal water system, the municipal water system shall be protected by an approved double check valve assembly.

(3) In the case of any premises where there is any material dangerous to health which is handled in such a fashion as to create an actual or potential hazard to the municipal water system or there has been a backflow incident, either suspected or documented, the municipal water system shall be protected by an approved air-gap separation or an approved reduced pressure principal backflow prevention device. Examples of premises where these conditions exist include but are not limited to sewage treatment plants, sewage pumping stations, chemical manufacturing plants, hospitals, mortuaries and electroplating and metal finishing plants.

(4) In the case of any premises where there are uncontrolled cross-connections, either actual or potential, the municipal water system shall be protected by an approved reduced pressure principal backflow prevention device at the service connection.

(5) In the case of any premises where, because of security requirements or other prohibitions or restrictions, it is impossible or impractical to make a complete in-plant cross-connection survey, the municipal water system shall be protected against backflow or back siphonage from the premises by the installation of a backflow prevention device in the service line. In this case, maximum protection shall be required; that is, an approved air prevention device shall be installed in each service connection to the premises. (Prior code 10.14.080; Ord. 4 §1, 2005)

Sec. 13-5-90. Approved backflow prevention devices.

Any backflow prevention device required herein shall be of a model and size approved by the City Manager. The term *approved backflow prevention device* means a device that has been manufactured in full conformance with the standards established by the American Water Works Association entitled "AWWA C506-78 Standards for Reduced Pressure Principal and Double Check Valve Backflow Prevention Devices," which is hereby adopted by reference in its present form and as it may subsequently be amended from time to time as the City standard. The term *approved backflow prevention device* also means a device that has completely met the laboratory and field performance specifications of the Foundation for Cross-Connection Control and Hydraulic Research (FCC and HR) of the University of Southern California established by "Specifications of Backflow Prevention Devices – Section 10," of the most current issue of "Manual of Cross-Connection Control," which is hereby adopted by reference as the City laboratory and field performance specifications. Final approval shall be evidenced by a certificate of approval issued by an approved testing laboratory certifying full compliance with said AWWA standards and FCC and HR specifications. In addition to the aforementioned standards and specifications, all backflow prevention devices shall have a unique serial number attached to the device by the manufacturer. (Prior code 10.14.080; Ord. 4 §1, 2005)

Sec. 13-5-100. Test and certification of backflow prevention devices.

(a) The following testing laboratory has been qualified to test and certify backflow prevention devices:

Foundation of Cross-Connection Control and Hydraulic Research
University of Southern California
University Park
Los Angeles, CA 90089-0231

(b) Testing laboratories other than the laboratory listed above will be added to an approved list as they are qualified by the City Manager.

(c) Backflow prevention devices which may be subjected to backpressure or back siphonage that have been fully tested and have been granted a certificate of approval by said qualified laboratory and are listed on the laboratory's current list of "approved devices," and newly installed devices which have been inspected and installed to the satisfaction of the City Manager, shall be deemed in compliance with this Article. (Prior code 10-14-080; Ord. 4 §1, 2005)

Sec. 13-5-110. Violations and penalties.

Any person who violates any of the provisions of this Article commits a misdemeanor and shall be punished as provided by Section 10-1-40 of this Code. In addition, for the failure to comply with the provisions of this Article, the City Manager may elect to terminate water service to the owner's property. In addition, all customers shall be civilly liable to the City for all damages done to the City's water supply system, and for the cost of repairs and cleanup in the event the customer has failed to comply with the provisions of this Article. (Prior code 10.14.090; Ord. 7 §5, 2012)