

RULE XII

CROSS CONNECTION AND BACKFLOW PREVENTION

1. **PURPOSE:**

To protect the public water supply of the Water District from contamination and pollution.

To eliminate or control existing cross connected plumbing between the public water supply of the Water District and non-potable fluid systems.

To provide for a continuing program of cross connection control which will effectively prevent the contamination and pollution of the public water supply of the Water District.

To comply with Federal Laws and Kansas State Statutes relating to the protection of the public water supply of the Water District.

2. **DEFINITIONS:**

Agency-

The department of the Water District vested with the responsibility for enforcement of this Rule.

Air Gap-

The unobstructed vertical distance at least twice the diameter of the supply line and no less than one inch, 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.

Approved Device-

Shall mean devices tested and accepted by a recognized testing laboratory approved by the Kansas Department of Health & Environment and the General Manager.

Backflow-

The flow of water or other substances into the distribution system of a potable supply of water from any source other than its intended source. Backsiphonage is one type of backflow.

Backflow Preventer-

A device or means to prevent backflow.

Backsiphonage-

The flowing back of contaminated or polluted substance from a plumbing fixture or any vessel or source into the potable water supply system due to negative pressure in said system.

Contaminant-

Any substance that upon entering the potable water supply would render it a danger to the health or life of the consumer.

Cross Connection-

Any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other which contains water or any substance of unknown or questionable quality whereby there may be flow from one system to the other.

Double Check Valve Assembly-

A device consisting of two internally loaded soft seated check valves with positive shut-off valves on both upstream and downstream ends, and properly located test ports.

Dual Check Valve-

A device consisting of two internally loaded soft seated check valves. This device does not contain test ports and is acceptable for use only at the meter of residential customers and only in applications where the Water District is assured that only non-contaminating

substances are subject to backflow into the potable water supply system.

Free Water Surface-

A water surface at atmospheric pressure.

Flood Level Rim-

The edge of the receptacle from which water overflows.

Frost Proof Closet-

A hopper with no water in the bowl and with the trap and water supply control valve located below frost line.

General Manager-

The General Manager of Water District No. 1 of Johnson County, Kansas, and any officer or employee of the District delegated by the General Manager to perform his or her functions as provided in this Rule XII.

KDHE-

The Kansas Department of Health & Environment.

Plumbing-

The practice, materials and fixtures used in the installation, maintenance, extension and alteration of all piping fixtures, appliances, and appurtenances.

Pollution-

The presence of any foreign substance (organic, inorganic, or biological) in water which tends to degrade its quality so as to constitute a hazard or impair the usefulness or quality of the water to a degree which does not create an actual hazard to the public health but which does adversely affect the water.

Reduced Pressure Zone Backflow Preventer-

An assembly of two independently acting soft seated approved check valves together with a hydraulically operating mechanically independent differential pressure relief valve located between the check valves and at the same time below the first check valve. The unit shall contain properly located test cocks and resilient seated shut-off valves at each end of the assembly. To be approved these assemblies must be accessible for inspection and testing and be installed in an above ground location where no part of the assembly will be submerged.

Tester-

A trained technician certified in the testing and repair of backflow preventers.

Vacuum-

Any absolute pressure less than that exerted by the atmosphere.

Vacuum Breaker-

A device that permits entrance of air into the water supply distribution line to prevent backsiphonage.

Water, Potable-

Water free from impurities in amounts sufficient to cause disease or harmful physiological effects. Its quality shall conform to Kansas Department of Health & Environment requirements for public water supplies.

Water, Non-Potable-

Water that is not safe for human consumption or water that is of questionable potability.

3. **PRIVATE, AUXILIARY, OR EMERGENCY WATER SUPPLIES PROHIBITION:**

No person, company, corporation, or institution shall establish or permit to be established, or maintain or permit to be maintained, any unprotected cross connection and/or other condition which might lead to the pollution or contamination of the public

water supply of the Water District. Any plumbing connections for the withdrawal from or replenishment of private, auxiliary, or emergency water supplies and the method of connection and the use of such supplies shall be approved by the General Manager of the Water District and by the Kansas Department of Health and Environment. See Section 2, Definitions: Contaminant, Cross Connection, Pollution, and K.S.A. 65-163a. Private, auxiliary, or emergency water supplies shall be defined for this Rule as any lake, river, pond, stream, spring, well, tank, cistern, reservoir, tank truck, or other water containing device and related piping and delivery system for the purpose of supplying water to the customer's premises or equipment.

4. CROSS CONNECTION PROHIBITIONS:

Cross Connections between the Water District's public water supply system and other systems or equipment containing water or other substances known to be a pollutant or contaminant or of unknown or questionable safety are prohibited except when and where, as approved by the Water District, suitable protective devices to prevent backflow or backsiphonage are installed, tested, and maintained to assure safe, proper operation on a continuing basis.

5. APPROVAL OF PROTECTIVE DEVICES:

Any device installed for the prevention of backflow or backsiphonage shall have been certified by a recognized testing laboratory acceptable to the Water District. The type of device, its location within the plumbing system, and its details of installation shall be approved by the Water District. If, in the judgment of the General Manager or his authorized representative, a backflow prevention device is needed at a certain site, he shall give notice to the customer to immediately, or within a reasonable time, install such device. The installation of the device shall be at the expense of the customer.

6. MAINTENANCE REQUIREMENTS:

It shall be the duty and responsibility of each, every and all water customers, whether they be owners, lessees, or occupants of any property served by the Water District that have cross connections on such property to maintain all backflow and backsiphonage prevention devices in functional working condition and to make no piping or other arrangement to bypass any device. Backflow prevention devices shall not be bypassed, made inoperative, removed, or otherwise made ineffective without the specific written authorization of the Water District.

A. Testing Intervals:

Testing intervals shall not exceed one (1) year and overhauls shall not exceed five (5) years.

7. APPROVAL OF PLUMBING PLANS:

Plans for new or altered plumbing installation shall be submitted to the Water District for its review and approval prior to construction. The review is to determine the degree of hazard to the potable water supply and the method of protection to be required. Arrangements shall be made for the Water District's inspection of the backflow prevention system during construction and for a test, if necessary, at completion of construction.

8. CUSTOMER NOTIFICATION AND INSPECTION:

A. Customer Notification:

Each customer whose premises are known to have actual or potential cross connections in their plumbing system shall be notified by the Water District that an inspection is due. The inspection shall take place within thirty (30) days of the notification date. The inspection shall be performed by Water District personnel,

its authorized agents, or by the customer's agent approved by the Water District.

The inspection procedure shall include, but not be limited to, the following:

- (1) Review of known cross connections for proper prevention of backflow.
- (2) Identify new cross connections on the premises since the previous inspection.
- (3) Test backflow prevention device(s) for proper functional service and repair if necessary.
- (4) Authorize modification in the plumbing system to comply with these rules and regulations.
- (5) Bring all records concerning the backflow prevention on the premises to current status.

B. Bill of Reasonable Charge:

The customer may be billed a reasonable charge for services rendered by the Water District based on a schedule of fees established and maintained current by the Water District. The amount shall not exceed the actual cost of the Water District's labor, material, and overheads.

9. INSPECTORS AND TESTERS:

A. Customer's Inspector or Tester:

Inspections and testing of backflow prevention devices on customer's premises may be performed by contractors hired by the customer or by the customer's staff.

Inspectors and testers must be approved by the Water District.

B. Water District's Inspector or Tester:

Inspections and testing of backflow prevention devices on customer's premises may be performed by Water District personnel if deemed necessary by the Water

District.

10. RECORDS OF INSPECTION, TEST, AND REPAIRS:

A permanent record of all backflow prevention devices, installation date, inspection date, inspector name, condition of the device, repairs made, name of repair technician and date of repairs will be maintained by the Water District. In addition to this record, a tag containing the above data shall be attached to each backflow preventer.

11. CERTIFICATION AND APPROVAL OF TECHNICIANS:

Persons performing inspections and tests and repairs of backflow prevention devices and persons conducting surveys and investigations of property or properties served by the Water District shall be certified and the certification shall be pre-approved by the Water District.

A. Approved Training Courses:

The certification of individual technicians shall be by one or more of the following training courses approved by the Kansas Department of Health and Environment:

- (1). American Backflow Prevention Association
- (2). Missouri Department of Natural Resources
- (3). Kansas Department of Health & Environment
- (4). Kansas Environmental Training System
- (5). Certain professional trade or labor organizations with the following conditions:
 - (a). The person shall be approved for work only on the plumbing system pertaining to the training provided by the trade or labor

organization.

- (b). Pre-approval of training and certification credentials shall be obtained from the Water District.

B. Water District Approval and Roster of Certified Individuals:

The Water District will keep a list of approved certified individuals. The approval by the Water District shall be for a period not to exceed three (3) years or until their certification expires, whichever occurs first. The Water District may rescind its approval of any individual for reasonable cause.

12. INSPECTIONS:

The General Manager of the Water District shall have authority and may at any time cause surveys and investigations to be made of any property or properties served by the District's public water supply where cross connections with private, auxiliary or emergency water supplies are known to exist or where such supplies are likely to exist. The General Manager shall also cause surveys and investigations to be made of all properties where cross connected piping installations are likely to exist that may result in the pollution or contamination of the water supply of the Water District. Such surveys and investigations, including testing or observation and monitoring the testing of backflow and backsiphonage prevention devices by certified technicians for proper functional working conditions, shall be made a matter of Water District record, and shall be repeated as often as the General Manager shall deem necessary or advisable.

13. RESPONSIBILITY OF CUSTOMER:

It shall be the responsibility of each, every, and all water customers, whether they be owners, lessees, or occupants of any property served by the Water District, who have any private, auxiliary or emergency water supply used or useful on such property or any cross

connections between the Water District's public water supply system and other systems containing water or other substance known to be a pollutant or contaminant or of unknown or questionable safety, to furnish the Water District all information as to such private, auxiliary or emergency water supply. The failure or refusal of any water customer to give and furnish such information shall within the discretion of the General Manager be deemed sufficient cause to assume the presence of improper connections as hereinbefore stated in this Rule.

14. RESPONSIBILITY OF THE WATER DISTRICT:

A. General Manager's Responsibility:

The General Manager of the Water District shall be responsible for effectively conducting the cross connection and backflow prevention program of the Water District.

B. Design of Potable Water Supply: The Water District's potable water supply system shall be designed, installed and maintained in such a manner as to prevent contamination from non-potable sources through cross connections or any piping connection to the system.

15. DISCONTINUANCE OF SERVICE:

The General Manager of the Water District is authorized and directed to discontinue, at his own discretion, with or without notice, the water service to any property whereon any connection or defective or unsuitable backflow prevention device in violation of the provisions of this Rule is known to exist, and to take such other precautionary measures as he may deem necessary or advisable to eliminate any danger of pollution or contamination of the District's public water supply. Water service to such property shall

not be restored until such connection or connections or defective or unsuitable device or devices shall have been eliminated or corrected, in compliance with the provisions of this Rule. Your attention is called to Sections 65-163, 163a, and 171g, Kansas Statutes Annotated, and amendments thereto. (Also see Rule XV)

16. INTERCONNECTIONS:

A. Public Water Supplies:

Interconnections between two or more public water supplies shall be permitted only with the approval of the Kansas Department of Health & Environment (K.S.A. 65- 163, as amended).

B. Individual Water Supplies:

Connections between a private water supply and the public potable water are prohibited (K.S.A. 65-163, as amended).

C. Connections to Boilers:

Potable water connections to boiler feed water systems in which boiler water conditioning chemicals are or can be introduced shall be made through an air gap or through a reduced pressure zone principle backflow preventer located in the potable water line before the point where such chemicals may be introduced.

D. Connections to Lawn Irrigation Systems:

There is no Rule or Regulation adopted by the Water District requiring backflow prevention devices for lawn irrigation systems which are not used for applications of fertilizers, pesticides or other chemicals. However, state law (K.S.A. 1995 Supp. 65-171 y) does require at least a low-hazard double check valve on lawn irrigation systems that are installed, renovated, replaced or extended on or after July 1, 1994, and further provides that any such valve must be installed in such a

manner as to be easily accessible for inspection. The Water District encourages compliance with that state law, but will no longer require initial or annual testing on the backflow prevention device on lawn irrigation systems whether installed before or after July 1, 1994.

Reduced Pressure Zone Backflow Preventers are required by this Rule on lawn irrigation systems which are used for the application of fertilizer, pesticides or other chemicals, and are subject to inspection and testing as provided in Section 6, 7 and 8 of this Rule.

E. Prohibited Connections:

Connections to the public potable water supply system for the following is prohibited unless properly protected by the appropriate backflow prevention device.

- (1) Bidets
- (2) Operating, dissecting, embalming, and mortuary tables or similar equipment- in such installations the hose used for water supply shall terminate at least twelve (12) inches away from every point of the table or attachments.
- (3) Pumps for non-potable substance. Priming only through an air gap.
- (4) Building drains, sewers, or vent systems.
- (5) Commercial buildings or industrial plants manufacturing or otherwise using polluting or contaminating substances.
- (6) Any fixture of similar hazard.

F. Refrigeration Unit Condensers and Cooling Jackets:

Except when potable water provided for a refrigeration condenser or cooling jacket is entirely outside the piping or tank containing a toxic refrigerant, the inlet connection shall be provided with an approved backflow preventer.

G. Heat Exchangers:

Heat exchangers used to heat water for potable use shall be of the double wall type.

H. Protective Devices Required:

The type of protective device required under these rules and regulations shall be determined by the degree of hazards which exist as follows:

- (1) Premises having auxiliary water supply shall protect the public system by either an approved air gap or an approved reduced pressure principle backflow prevention assembly.
- (2) Premises having water or substances which would be non-hazardous to the health and the well-being of the consumers shall protect the public system with no less than an approved double check valve assembly.
- (3) Premises where material which is dangerous to health is handled in a manner which creates an actual or potential hazard shall protect the public system by an approved air gap or an approved reduced pressure principle backflow prevention assembly.
- (4) Premises where cross connections are uncontrolled shall protect the public water supply by installing an approved air gap or an approved reduced pressure principle backflow prevention device at the service connection.
- (5) Premises where because of security requirements or other prohibitions it is impossible to complete an in-plant cross connection inspection, the public

system shall be protected by an approved air gap or an approved reduced pressure principle backflow prevention assembly.

Premises which may fall into one or more of the categories mentioned in Section 16, Subsection H, Paragraphs 1-5 of this Rule, may be, but are not limited to, the following:

- (a). Beverage bottling plant.
- (b). Buildings- Hotels, apartments, public or private buildings, or other structures having actual or potential cross connections.
- (c). Car wash facilities.
- (d). Chemical manufacturing, handling, or processing plant.
- (e). Chemically contaminated water.
- (f). Dairies and cold storage facilities.
- (g). Film or photography processing lab.
- (h). Fire systems.
- (i). Hospitals, medical centers, morgues, mortuaries, autopsy facilities, clinics, or nursing and convalescent homes.
- (j). Laundries.
- (k). Metal cleaning, processing, or fabricating plants.
- (l). Oil and gas production, storage, or transmission facilities.
- (m). Packing or food processing plants.
- (n). Paper and paper products plants.
- (o). Power plants.
- (p). Radioactive materials plants or handling facilities.
- (q). Restricted or classified facilities.

- (r). Rubber plants.
- (s). Sand, gravel, or asphalt plants.
- (t). Schools or colleges.
- (u). Sewage and storm drainage facilities and reclaimed water systems.
- (v). Solar heating systems.
- (w). Temporary service-fire hydrants, air valves, blow-offs and other outlets.
- (x). Water front marinas.

17. INSTALLATIONS:

Approved devices shall be installed at all fixtures and equipment where backflow or backsiphonage may occur and where a minimum air gap between the potable water outlet and the fixture or equipment flood-level rim cannot be maintained. Backflow and backsiphonage devices of all types shall be in an accessible location. Installation in pits or other location not properly drained shall be prohibited, except that dual check valves may be installed in the meter box.

A. Connections NOT Subject to Backpressure:

Where a water connection is not subject to backpressure, a vacuum breaker shall be installed on the discharge side of the last valve on the line serving the fixture or equipment. A list of some conditions requiring protective devices of this kind are given in the following table titled **CROSS CONNECTIONS WHERE PROTECTIVE DEVICES ARE REQUIRED.**

Cross Connections where Protective Devices are Required
and Critical Level (C-L) Settings for Vacuum Breakers

<u>Fixtures or Equipment</u>	<u>Method of Installation</u>
Aspirators & Ejectors	C-L at least 6 inches above flood level of receptacle served.
Dental Unit	On models without built in vacuum breakers C-L at least 6 inches above flood level rim of bowl.
Commercial dish washing machines	C-L at least 6 inches above flood level of machine. Installed on both the hot and cold water supply lines.
Garbage can cleaning machines	C-L at least 6 inches above flood level of machine. Installed on both the hot and cold water supply lines.
Hose outlets	C-L at least 6 inches above highest point on hose line.
Commercial laundry machines	C-L at least 6 inches above flood level of machine. Installed on both the hot and cold supply lines.
Steam tables	C-L at least 6 inches above flood level rim.
Tanks and vats	C-L at least 6 inches above flood level rim or line.
Trough urinals	C-L at least 30 inches above perforated flush pipe.
Flush tanks	Equipment with approved ball cock, installed according to manufacturer's instructions.
Hose bibbs	C-L at least 6 inches above flood level of receptacle served.

B. Connections Subject to Backpressure:

Where a potable water line is made to a line, fixture, tank, vat, pump, or other

equipment with a hazard of backflow or backsiphonage where the water connection is subject to backpressure and an air gap cannot be installed, the General Manager may require the use of an approved reduced pressure principle backflow preventer. A partial list of such connections is shown in the following table titled PARTIAL LIST OF CROSS CONNECTIONS SUBJECT TO BACKPRESSURE.

Partial List of Cross Connections Subject to Backpressure:

Chemical lines	Pumps
Dock water outlets	Steam lines
Individual water supplies	Swimming pools
Industrial process water lines	Pressure tanks
Tanks & vats - bottom inlets	Hose bibbs

C. Barometric Loop:

Water connections where an actual or potential backsiphonage hazard exists may in lieu of devices specified above be provided with a barometric loop. Barometric loops shall precede the point of connection.

D. Dual Check Valves:

Dual check valves may be installed at the meter. These valves shall be inspected and repaired not less frequent than every three (3) years. These valves shall be installed only in situations where the General Manager is assured that only non-contaminating substances are subject to backflow into the potable water system.

E. Vacuum Breakers:

Atmospheric vacuum breakers shall be installed with the critical level at least six (6) inches above the flood rim of the fixture they serve and on the discharge side of the last control valve to the fixture. No shut off valve or faucet shall be installed beyond the atmospheric vacuum breaker. Pressure vacuum breakers shall be installed with the critical level at least twelve (12) inches above the flood

rim but may have control valves downstream from the vacuum breaker. For closed equipment or vessels such as pressure sterilizers the top of the vessel shall be considered the flood level rim and a check valve shall be installed on the discharge side of the pressure vacuum breaker.