



# Backflow Prevention Policy

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## ***Backflow Explained***

Backflow is the undesirable reversal of flow in a potable water distribution system. Water that is always under pressure can only flow in one direction. Then how can water flow reverse? Water will always flow towards the point of lowest pressure. If a water main were to break or if the fire department opened several fire hydrants, the pressure in the main could drop. The demand upstream would cause a reversal in flow.

Cross connections and the possibility of backflow need to be recognized so they do not occur. A garden hose submerged in a hot tub, swimming pool, car radiator, or attached to an insect/fertilizer sprayer could siphon the liquid back into the water main.

Backflow prevention devices are designed to protect the public water system from these types of concerns.

## ***Intent***

The intent of this policy is to protect the City of Temple public water supply from contamination caused by cross-connections and backflow. This policy is intended to fully meet the requirements established in the *Rules and Regulations for Public Water Systems* as published by the Texas Commission on Environmental Quality (TCEQ). Pertinent sections are 290.44 (h) and 290.46 (i & j).

Recognized standards used to develop this policy were the *Recommended Practice for Backflow Prevention and Cross-Connection Control* by the American Water Works Association (AWWA), the *Manual of Cross-Connection Control* by the Foundation for Cross-Connection Control and Hydraulic Research (FCCHR), and the *Cross-Connection Control Manual* by the Environmental Protection Agency (EPA). Also utilized are the *Statutory Authority and Rules and Regulations for Landscape Irrigators and Installers* by the TECQ.

Selection of the proper protection for a given application is often subjective in nature. Therefore, when administering this policy the Public Works Department shall consult the above-mentioned references for guidance in proper application of backflow-prevention and cross-connection control measures in addition to this policy.

### ***Summary of Procedures Prior to Installation of Backflow Preventer***

1. All backflow prevention assemblies and approved testers shall be registered with the Public Works Department. All backflow prevention assemblies shall be nationally recognized and certified as an approved testable device.
2. All testing shall be by TCEQ approved licensed tester who is registered with the Public Works Department.
3. All backflow prevention assemblies shall be tested according to TCEQ regulations prior to the permanent activation of the plumbing system and thereafter annually.
4. All backflow prevention assemblies shall have plastic or brass caps placed upon all test cocks (NO GALVANIZED PLUGS).
5. All back flow prevention assembly devices that do not have manufactures identification plate attached to the device and that do not have a legible serial number must be replaced with a new device.
6. All backflow prevention assemblies shall be installed by licensed individuals who meet the requirements of the City of Temple. All backflow prevention assemblies must be tested after installation by an approved City of Temple registered tester. Test reports must be submitted to the Public Works Department at 3210 East Ave H, Temple, Texas 76501 within 15 days of the test.
7. All testers must register with the Public Works Department (see below for requirements/documentation necessary to become a backflow tester within the City of Temple).

### ***Connection to auxiliary water systems prohibited***

Connections between private plumbing systems connected to the City of Temple public potable water supply and auxiliary water systems are prohibited.

Owners of private plumbing systems connected to the City of Temple public potable water supply which have access to auxiliary water systems are required to demonstrate to the satisfaction of the Superintendent of Utilities that there is no physical connection to the auxiliary water system.

Owners of private plumbing systems previously connected to an auxiliary water system must be physically disconnected from that water system and disinfected according to the "Procedure for Disconnection from Auxiliary Water Supply" prior to connection to the City of Temple public potable water supply.

### ***Procedure for Disconnection from Auxiliary Water Supply***

1. Physical disconnection from the auxiliary water system must be inspected and approved by the Public works Department. Separation achieved by installation of a valve, check valve, or backflow preventer is not acceptable. This disconnection must be permanent and is subject to re-inspection by the Public Works Department. The private plumbing system cannot be reconnected to auxiliary water system at any time.

2. The private plumbing system will be connected to the City of Temple public potable water supply through a temporary reduced-pressure backflow-prevention assembly (RPBA) provided by the City of Temple.
3. The owner of the private plumbing system will flush the private plumbing system through the RPBA for a minimum of 15 minutes.
4. The owner of the private plumbing system will disinfect the private plumbing system by a process of chlorination. A quantity of household bleach or chlorine will be introduced into the private plumbing system. The quantity added will be sufficient to create a minimum of 10 mg/L total chlorine residual after 24 hours in the private plumbing system.
5. The chlorinated private plumbing system will stand for a minimum of 24 hours. The Public Works Department will test chlorine residual after the 24-hour period, if the chlorine residual is less than 10 mg/L the owner must repeat steps 3 & 4.
6. The owner of the private plumbing system shall flush the private plumbing system until chlorine residuals are at the same level as in the main.
7. The Public Works Department will collect a suitable sample for bacteriological analysis.
8. If bacteriological analysis indicates the presence of coliform, the owner must repeat steps 3 through 7.
9. The Public Works Department shall remove the temporary RPBA.

Water used for flushing will be charged to customer as well as normal service connection fees. The Public Works Department is responsible only for providing the service connection, temporary RPBA, analyzing for chlorine residual, collecting samples, and performing bacteriological analysis. The customer is responsible for all modifications necessary to his private plumbing system to accommodate the disinfection procedure and for conducting the procedure.

### ***New Service Connections***

Before the Public Works Department makes a new service connection within the city limits a "Service Inspection Certification" completed by the plumbing inspector or customer service inspector indicating compliance with this policy must be on file.

### ***Construction Service Connections***

In cases where service connection is requested prior to completion of the premises the applicant for service may request a construction service connection. The Public Works Department may make a construction service connection provided the applicant has on file a valid plumbing permit from the Construction Safety office.

The plumbing inspector shall make regular inspections during the course of construction and immediately notify the Public Works Department of any unsafe plumbing practices that result in a health hazard to the public drinking water supply. The Public Works Department shall physically disconnect the construction service connection when notified by the plumbing inspector of a health hazard or upon cancellation of the plumbing permit.

A "Service Inspection Certification" completed by the plumbing inspector indicating compliance with this policy must be on file prior to converting the construction service account to a permanent account.

### ***Internal Fixture Protection Required***

The inspector shall require backflow protection at the source of any potential hazard (internal fixture protection). The selection of the proper protection is at the discretion of the inspector but should generally follow the "Guide to the Assessment of Hazard and Selection of Assemblies for Internal Protection" and provisions of the plumbing code and TCEQ regulations.

The inspector shall notify the Public Works Department of all potential hazards identified and the internal fixture protection required on the "Service Inspection Certification" form.

### ***Automatic Pressure Cut-Off Devices***

The plumbing inspector shall require an automatic pressure cut-off device to be installed for all pumps which take suction from the public water supply or building plumbing without an approved air gap. The automatic pressure cut-off device must make the pump inoperative at a suction supply pressure of less than 20 psi.

### ***Premises Isolation Protection Required***

The Public Works Department shall require backflow protection at the service connection (premises isolation) of premises where activities which are potential hazards to the public water supply occur. The selection of the proper protection is at the discretion of the Superintendent of Utilities but should generally follow table "Guide to Selection of Assemblies for Premises Isolation".

Where more than one activity from the table occurs at the same premise, all service lines to the premise should be protected with the appropriate backflow-prevention assembly for the activity with the highest degree of hazard. Exceptions to this rule would be when there are separate service lines for landscape irrigation (no injection) or for Class 1&2 fire lines.

### ***Additional Requirements for Connections Outside the City Limits***

Requests for new service connections or changes in accounts outside the city limits will follow the procedures and requirements listed above with the following exceptions:

1. A "Water Service Agreement" completed by the applicant for service must be on file before the Public Works Department makes the service connection or changes the account.
2. A Qualified Customer Service Inspector shall perform all duties delegated to the plumbing inspector.
3. At the discretion of the Superintendent of Utilities, the Customer Service Inspection may be performed and a "Service Inspection Certification" form completed by a licensed plumber working for the applicant for service.

## Guide to Selection of Assemblies for Premises Isolation

Description of Premise or Activity	Assessment of Hazard	Required Assembly at Service Connection
Aircraft and missile plants	Health	RPBA
Automotive plants	Health	RPBA
Buildings – hotels, apartment houses, public and private buildings, or any other structures having unprotected cross-connections	Health	RPBA
Car wash facilities	Health	RPBA
Chemical plants – manufacturing, processing, compounding, or treatment	Health	RPBA
Chemically contaminated water systems	Health	RPBA
Civil works	Health	RPBA
Cold storage plants (includes ice manufacturers)	Health	RPBA
Film laboratories	Health	RPBA
Fire Systems (Class 1-3)	Nonhealth	DCVA with leak detector
Fire Systems (Class 4-6) <sup>3</sup>	Health	RPBA with leak detector

Food and beverage processing plants (includes beverage bottling plants, breweries, canneries, packing houses, rendering plants, reduction plants, dairies, creameries, ice cream plants)	Health	RPBA
Hospitals, medical buildings, sanitariums, morgues, mortuaries, autopsy facilities, nursing and convalescent homes, clinics, laboratories, and veterinary clinics	Health	RPBA
Irrigation systems (all)	Health	RPBA / PVB
Laundries and dye works	Health	RPBA
Metal manufacturing, cleaning, processing, and fabricating plants	Health	RPBA
Motion picture studios	Health	RPBA
Multi-storied buildings	Nonhealth	DCVA
Multiple services – interconnected	Nonhealth	DCVA
Oil, gas, or petroleum processing, production, storage, or transmission properties	Health	RPBA
Paper and paper products plant	Health	RPBA
Plating plants	Health	RPBA

Power plants (includes large heating, refrigerating, and power plant used in large buildings and commercial or industrial plants)	Health	RPBA
Radioactive materials or substances handling – plants or facilities	Health	RPBA
Restricted, classified, or other closed facilities	Health	RPBA
Rubber plants – natural or synthetic	Health	RPBA
Sand and gravel plants	Health	RPBA
Schools and colleges	Health	RPBA
Sewage and storm drain facilities, reclaimed water	Health	RPBA
Solar heating system – direct and auxiliary (recirculating)	Health	RPBA
Temporary service (includes bulk water sales)	Health	RPBA, AG
Used water	Health	RPBA
Waterfront facilities and industries, marinas	Health	RPBA
Wholesale water sales	Health	RPBA, AG

**\*The use of a backflow prevention assembly at the service connection shall be considered as additional backflow protection and shall not negate the use of backflow protection on internal hazards as outlined and by local plumbing codes.**

**Guide to the Assessment of Hazard and Selection of Assemblies for Internal Protection**

Description of Cross Connection	Assessment of Hazard	Required Assembly at Fixture
Aspirators (medical)	Health	RPBA
Bedpan washers	Health	RPBA
Autoclaves	Health	RPBA
Specimen tanks	Health	RPBA
Sterilizers	Health	RPBA
Cuspidors	Health	RPBA
Lab bench equipment	Health	RPBA
Autopsy and mortuary equipment	Health	RPBA
Sewage pump	Health	AG
Sewage ejectors	Health	AG
Fire systems (Class 4-6)	Health	RPBA
Connection to sewer pipe	Health	AG
Connection to plating tanks	Health	RPBA
Irrigation systems (all)	Health	RPBA
Connection to salt-water cooling system	Health	RPBA
Tank vats or other vessels containing toxic substances	Health	RPBA
Connections to industrial fluid systems	Health	RPBA
Dye vats or machines	Health	RPBA
Cooling towers with chemical additives	Health	RPBA
Trap primer	Health	AG
Auxiliary water system (wells, ponds, other water purveyor, springs, rivers, streams, lakes, etc.)	Health	AG
Booster pumps	Health	RPBA

Steam generators	Nonhealth	RPBA
Heating equipment	Nonhealth	DCVA
Commercial	Nonhealth	RPBA
Domestic	Nonhealth	DCVA
Fire system (Class 1-3)	Nonhealth	DCVA
Swimming pools	Nonhealth	DCVA
Public	Nonhealth	RPBA, AG
Private	Nonhealth	PVB, AG
Vending Machines	Nonhealth	RPBA
Ornamental fountains	Nonhealth	DCVA
Degreasing equipment	Nonhealth	DCVA
Hose bibbs	Nonhealth	AVB
Flexible shower heads	Nonhealth	AVB, PVB
Steam tables	Nonhealth	DCVA
Washing equipment	Nonhealth	DCVA
Shampoo basins	Nonhealth	AVB
Industrial / Commercial Kitchen equipment	Nonhealth	DCVA
Domestic space-heating boiler	Nonhealth	RPBA

***Existing Service Connections***

***Commercial Accounts***

The Superintendent of Utilities shall conduct a survey of all existing commercial accounts. This survey shall ask customers to categorize existing hazards and register installed backflow-prevention assemblies. Customers refusing to answer the survey shall be considered as a "restricted access premise" and required to install the appropriate backflow prevention assembly at the service connection.

Where existing internal unprotected "health" hazards are identified in the survey the customer will be required to install the appropriate backflow-prevention assembly at their expense. Where activities are conducted requiring premises isolation for

"health" hazard are identified the customer will be required to install, at their expense, the appropriate backflow-prevention assembly.

A "Service Inspection Certification" shall be completed prior to any change in a commercial account. This inspection shall be conducted by A plumbing inspector or A Qualified Customer Service Inspector inside the city limits and by a Qualified Customer Service Inspector outside the city limits. Any deficiencies noted during the survey shall be corrected prior to changes in the account.

### ***Wholesale Accounts***

All wholesale accounts shall be required to install, at their expense, a RPBA at their master meter location upon any renegotiations or changes in their contract.

### ***Public Awareness***

The Superintendent of Utilities shall periodically conduct a public awareness campaign. This campaign shall utilize water bill inserts, press releases, mail outs, demonstrations, or other methods as appropriate to educate both commercial and residential of the hazards associated with cross-connections and their remedies.

### ***Bulk Water Sales (Fire Hydrant Meters)***

All persons utilizing bulk water dispensing stations shall be required to maintain the appropriate air gap between the filling hose and receiving tank. A properly completed "Bulk Water Sales Affidavit" shall be on file for each account before the Public Works Department shall install a Bulk Water Sales meter.

### ***Public Works Department Compliance***

The Public Works Department shall comply with all provisions of this policy at service connections supplying the Public Works Department. The Superintendent will cause an inspection to be conducted at all Public Works Department Facilities, specifically including the water treatment plant, wastewater treatment plant, and all sewage lift station facilities. All hazards identified shall be protected with the appropriate backflow-prevention assembly.

All backflow-prevention assemblies on Public Works Department premises installed to protect from potential "health" hazards and all bulk water sales backflow-prevention assemblies shall be tested in accordance with the provisions of this policy.

## **Approved Backflow Prevention Assemblies**

Any backflow-prevention assembly required shall be a model and size approved by the Superintendent of Utilities. All approved backflow-prevention assemblies shall be manufactured in full accordance with the standards titled:

AWWA C510-89--Standard for Double Check Valve Backflow-Prevention Assembly,

AWWA C511-89--Standard for Reduced Pressure Principle Backflow-Prevention Assembly,

and shall have met completely the laboratory and field performance specifications of the Foundation for Cross-Connection Control and Hydraulic Research (FCCHR) titled:

"Specification of Backflow-Prevention Assemblies"-Sec. 10 of the most current issue of the *Manual of Cross-Connection Control*.

Final approval shall be evidenced by a "Certificate of Approval" issued by FCCHR testing laboratory certifying full compliance with said AWWA standards and FCCHR specifications.

## **Installation Requirements**

Installation of any required backflow-prevention assembly shall be in accordance with the manufacturer's specifications and recommendations. Installations shall be consistent with the installation specifications in Chapter 4.2 of *AWWA M14 - Recommended Practice for Backflow Prevention and Cross-Connection Control*. All backflow-prevention assemblies required for internal fixture protection shall be installed in accordance with the adopted plumbing code and TCEQ Regulations.

Special attention is drawn to the following installation requirements:

1. No bypass piping of any required backflow-prevention assembly is allowed unless an equal backflow-prevention assembly protects the bypass piping.
2. A DCVA should not be installed below ground level unless provided with adequate drainage to maintain a dry location.
3. A RPBA shall not be installed in a pit below the ground.
4. All backflow-prevention assemblies required for premises isolation shall be located immediately downstream of the meter or for unmetered lines as close to the point of departure from the public water main as feasible.

## **Required Testing and Inspections**

All backflow-prevention assemblies shall be tested upon installation. The customer is also required to conduct an annual test of all such required backflow-prevention

assemblies. These tests are required for assemblies required for internal fixture protection as well as those required for premise isolation.

Tests shall be conducted by a TCEQ Licensed backflow-prevention assembly tester who is registered with the City of Temple in accordance with test procedures established in the latest edition of the *Manual of Cross-Connection Control* by the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California.

The recognized backflow-prevention assembly tester shall complete an "Inspection Report: Cross-connection and Backflow-Prevention Assembly" for each assembly tested and submit it to the Public Works Department.

The customer is also required to conduct an annual inspection of all air gaps required for protection against "health" hazards. The customer shall complete the "Air Gap Certification" and submit it to the Public Works Department.

### ***Program Administration***

The Public Works Department shall:

1. Maintain a file of completed "Service Inspection Certification" forms.
2. Track the status of new service connections, plumbing permits, and "Service Inspection Certifications" and notify the Superintendent of Utilities of any completed service connections where the plumbing permit has been closed out and a "Service Inspection Certification" has not been completed.
3. Maintain a database of all backflow prevention devices, air gaps, and automatic pressure cut-off devices required by this policy. This database shall include address, location, hazard protected against, class of hazard, serial #, size, type, model, manufacturer, date of installation, and date of last certification.
4. Notify the Superintendent of Utilities of any backflow prevention devices or air gaps required protecting against health hazards that have not been certified in more than 1 year.
5. Maintain a file of completed annual inspection reports.

The Business Office shall:

1. Not issue a request for the placement of a fire hydrant meter unless they have on file a completed "Bulk Water Sales Affidavit".
2. Not issue a request for a new service connection outside the City limits unless they have on file a completed "Water Service Agreement".
3. Not change an account outside the City limits unless they have on file a completed "Water Service Agreement".
4. Maintain files of completed "Bulk Water Sales Affidavits" and "Water Service Agreements".

### ***How to become a Registered Tester***

The City of Temple requires licensed and City registered cross connection testers to test backflow prevention devices in the City of Temple. Test results from non-city registered testers will not be accepted. To register as a backflow prevention assembly tester with the City of Temple a registration form must be completed and submitted with the following documentation.

1. Certificate/License # if you are a licensed plumber.
2. Certificate/License # if you are a licensed fire sprinkler contractor (if you are a licensed fire sprinkler contractor, a current copy of your company's fire sprinkler certificate of registration from the Texas Department of Insurance, State Fire Marshall's Office).
3. Certificate/License # if you are a licensed lawn sprinkler contractor.
4. Certificate/License # if you are a licensed cross connection backflow prevention tester.
5. Testing gauge calibration report within the last year.

**Registrations must be completed annually in person at Public Works Department** at 3210 East Ave H Temple, Texas 76501. City of Temple test reports are available free of charge in the Public Works Department or on the City of Temple Web Site.

Upon submission and approval of the registration form, the tester will be added to the approved Cross Connection Tester List which is furnished to all establishments requiring testing of their backflow devices.

### ***Definitions***

**Air Gap** – An approved air gap is the unobstructed vertical distance through free atmosphere between the lowest point of a water supply outlet and flood level rim of the fixture or assembly into which the outlet discharges. These vertical, physical separations must be at least twice the diameter of the water supply outlet, but never less than 1 inch.

**Atmospheric vacuum breaker (AVB)** – The AVB consists of a float check, a check seat, and an air inlet port. A shutoff valve immediately upstream may be an integral part of the assembly. The AVB is designed to allow air to enter the downstream water line to prevent backsiphonage. This unit may never be subjected to a backpressure condition or have a downstream shutoff valve, or be installed where it will be in continuous operation for more than 12 hours.

**Automatic pressure cut-off device** – A device which will render an associated pump inoperative when suction supply pressures are less than 20 psi.

**Auxiliary Water System** - Any water supply on or available to the premises other than the City of Temple public potable water supply. These other water supplies may include water from another purveyor's public potable water supply or any natural source(s) such as a well, lake, spring, river, stream, harbor, and so forth.

**Bulk Water Sales** - Any sale of water through a fire hydrant meter.

**Chemically Contaminated Water Systems** - Any system where chemicals are used as an additive to the water supply for prevention of scale formation, corrosion, algae, slime growths, etc., or where the water supply is used for transmission and distribution of chemicals, or where the chemicals are used with water in compounding or processing products.

**Civil Works** - Federal, state, city, county, or district yards; docks and facilities, or military camps, posts, stations, public buildings and facilities

**Commercial Account** - Account to serve anything but single family residential use.

**Contamination** - The presence of any foreign substance (organic, inorganic, radiological or biological) in water which tends to degrade its quality so as to constitute a hazard or impair the usefulness of the water.

**Construction Service Connection** - A service connection installed before the completion of the premises to be served for the purpose of providing water during construction.

**Cross-Connection** - A physical connection between a public water system and either another supply of unknown or questionable quality, any source which may contain contaminating or polluting substances, or any source of water treated to a lesser degree in the treatment process.

**Double check valve assembly (DCVA)** - An assembly composed of two independently acting, approved 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 assembly shall only be used to protect against a nonhealth hazard.

**Existing Service Connection** - Service connection installed prior to the effective date of this policy.

**"Health" Hazard** - A cross-connection, potential cross-connection, or other situation involving an substance that could cause death, illness, spread of disease, or has a high probability of causing such effects if introduced into the potable drinking water supply.

**Irrigation System** - An assembly of component parts permanently installed for the controlled distribution and conservation of water for the purpose of irrigating any type of landscape vegetation in any location or for the purpose of dust reduction or erosion control.

**Leak detector** – A meter and bypass of a backflow-prevention assembly in a fire line. A backflow-prevention assembly equal to the main line backflow-prevention assembly must protect the bypass.

**"Nonhealth" Hazard** – A cross-connection or potential cross-connection involving any substance that generally would not be a "health" hazard but would constitute a nuisance, or be aesthetically objectionable, if introduced into the potable water supply.

**Physically Disconnect** – Removal of piping, fixtures, or assemblies to create a physical, unobstructed, separation between the water supply outlet and the inlet

**Plumbing Inspector** – Any person employed by the City of Temple for the purpose of inspecting plumbing work and installations in connection with health and safety laws and ordinances, who has no financial or advisory interest in any plumbing company, and who has successfully fulfilled the examinations and requirements of the Texas State Board of Plumbing Examiners.

**Pressure vacuum breaker (PVB)** – An assembly consisting of an independently operating internally loaded check valve, an independently operating loaded air inlet valve located on the discharge side of the check valve, with properly located resilient-seated test cocks and tightly closing resilient-seated shutoff valves attached at each end of the assembly designed to operate under pressure for prolonged periods of time to prevent backsiphonage. The pressure vacuum breaker may not be subjected to any backpressure.

**Private Plumbing System** – The piping system belonging to the customer, normally being all line downstream of the meter, property line, or easement line.

**Qualified Customer Service Inspector** – Any person employed by the City of Temple Public Works Department for the purpose of inspecting the private water distribution facilities and installations in connection with health and safety laws and ordinances, who has successfully fulfilled the examinations and requirements to the Texas Commission on Environmental Quality (TECQ) established in the *Rules and Regulations for Public Water Systems* section 290.46 (j).

**Recognized backflow-prevention assembly tester** – A person who successfully fulfilled the examinations and requirements of the Texas Commission on Environmental Quality (TCEQ) established in the *Rules and Regulations for Public Water Systems* section 290.44 (h)(4).

**Reduced-pressure principle backflow-prevention assembly (RPBA)** – The approved RPBA consists of two independently acting check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and below the first check valve. These units are located between two tightly closing resilient-seated shutoff valves as an assembly and are equipped with properly located resilient-seated test cocks.

**Service Connection** – A piping connection between the City of Temple main and a user's private plumbing system. The service connection is property of the City of

Temple and normally includes all piping up to the downstream side of the meter, property line, or easement line.

**Wholesale Account** – An account established to sell water to another water purveyor according to the terms of a negotiated contract.

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Current as of 9 September 2008