FREQUENTLY ASKED QUESTIONS

CROSS-CONNECTIONS AND BACKFLOW: WHAT ARE THEY?

QUESTION: What is a cross-connection?

ANSWER: *A cross-connection is any temporary or permanent connection between a public water system or consumer's potable (i.e. drinking) water system or any source or system containing nonpotable water or other substances. An example is the piping between a public water system or consumer's potable water system and an auxiliary water system, cooling system, or irrigation system.*

QUESTION: What is backflow?

ANSWER: *Backflow is the undesirable reversal of flow of non-potable water or other substances through a cross-connection and into the piping of a public water system or consumer's potable water system. There are two types of backflow: 1) backpressure backflow and 2) backsiphonage.*

QUESTION: What is backpressure backflow?

ANSWER: *Backpressure backflow is backflow caused by a downstream pressure that is greater than the upstream or supply pressure in a public water system or consumer's potable water system. Backpressure (i.e. downstream pressure that is greater than the potable water supply pressure) can result from an increase in downstream pressure, a reduction in the potable water supply pressure, or a combination of both. Increases in downstream pressure can be created by pumps, temperature increases in boilers, etc. Reductions in potable water supply pressure occur whenever the amount of water being used exceeds the amount of water being supplied, such as during water line flushing, firefighting, or breaks in water mains.*

QUESTION: What is backsiphonage?

ANSWER: *Backsiphonage is backflow caused by a negative pressure (i.e. a vacuum or partial vacuum) in a public water system or consumer's potable water system. The effect is similar to drinking water through a straw. Backsiphonage can occur when there is a stoppage of water supply due to nearby firefighting, a break in a water main, etc.*

QUESTION: Why do water suppliers need to control cross-connections and protect their public water systems against backflow?

ANSWER: *Backflow into a public water system can pollute or contaminate the water in that system (i.e. backflow into a public water system can make the water in that system unusable or unsafe to drink), and each water supplier has a responsibility to provide water that is usable and safe to drink under all foreseeable circumstances. Furthermore, consumers generally have absolute faith that water delivered to them through the public water system is always safe to drink. For these reasons, each water supplier must take reasonable precautions to protect its public water system against backflow.*

QUESTION: What should water suppliers do to control cross-connections and protect their public water system against backflow?

ANSWER: *Water suppliers usually do not have the authority or capability to repeatedly inspect every customer's premises for cross-connections and backflow protection. Alternatively, each water supplier should ensure that a proper backflow prevention device is installed and maintained at the water service connection to each system or premises that poses a significant hazard to the public water system. Generally, this would include the water system connection to each dedicated fire protection system or irrigation piping system and the water service connection to each of the following types of premises; (1) premises with an auxiliary or reclaimed water system; (2) industrial, medical, laboratory, marine or other facilities where objectionable substances are handled in a way that could cause pollution or contamination of the public water system; (3) premises exempt from the State Plumbing Code and premises where an internal backflow prevention device required under the State Plumbing Code is not properly installed or maintained; (4) classified or restricted facilities; and (5) tall buildings. Each water supplier should also ensure that a proper backflow prevention device is installed and maintained at each water loading station owned or operated by the water supplier.*

QUESTION: What is a backflow prevention device (i.e. backflow preventer)?

ANSWER: *A backflow preventer is a means or mechanism to prevent backflow. The basic means of preventing backflow is an air gap, which either eliminates a cross-connection or provides a barrier to backflow. The basic mechanism for preventing backflow is a mechanical backflow preventer, which provides a physical barrier to backflow. The principal types of mechanical backflow preventer are the reduced-pressure principle assembly, the pressure vacuum breaker assembly, and the double check valve assembly. A secondary type of mechanical backflow preventer is the residential dual check valve.*

QUESTION: What is an air gap?

ANSWER: *An air gap is a vertical, physical separation between the end of a water supply outlet and the flood-level rim of a receiving vessel. This separation must be at least twice the diameter of the water supply outlet and the flood-level rim of the receiving vessel. This separation must be at least twice the diameter of the water supply outlet and never less than one inch. An air gap is considered the maximum protection available against backpressure backflow or backsiphonage but is not always practical and can easily be bypassed.*

QUESTION: What can I do to prevent backflow and backsiphonage?

ANSWER: *Ensure that there are no cross-connections between the public water supply line (i.e. drinking water pipes) and such things as swimming pools, wells, irrigation ponds, boilers, cooling towers, and fire protection systems. Whenever possible, use an air gap to eliminate a cross-connection because it will provide the most protection from backflow and backsiphonage. In the event an air gap is not possible, it will be necessary to install a backflow prevention device. If you have any questions, please do not hesitate to contact a licensed plumber or Harpeth Valley Utilities District at (615) 352-7076.*

HARPETH VALLEY UTILITIES DISTRICT
OF DAVIDSON AND WILLIAMSON COUNTIES, TENNESSEE

INSTALLATION CRITERIA FOR REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION DEVICE

PART 1 GENERAL GUIDELINES

1.1. All backflow prevention devices will be inspected and tested to verify that the units meet the following requirements as set forth by the Harpeth Valley Utilities District, before they will be accepted.

PART 2 REQUIREMENTS

2.1. The devices must never be subject to flooding; therefore must:

A. Never be located in a pit or other area subject to flooding.

B. Avoid piped drains for enclosures housing the units. Provisions must be made for discharging water (maximum design discharge) directly through the wall of the enclosure housing the unit at a slightly higher elevation than surrounding ground level or maximum flood level.

C. The lowest part of the relief valve discharge port must be a minimum of 12 inches plus the nominal diameter of the device, above either (1) the ground, (2) top of opening(s) in enclosure wall or (3) maximum flood level, whichever is highest, in order to prevent any part of the device from becoming submerged.

2.2. RP units used for the protection of the water distribution system must be models acceptable to Harpeth Valley Utilities District and currently listed as approved by the Tennessee Department of Environment and Conservation Division of Water Resources, Cross Connection Control Program.

2.3. The devices must be installed where the units can be easily accessed, tested and repaired.

A. All devices should be installed in accordance with the manufacturer's installations.

B. Devices 2 inches and smaller being installed inside must have a minimum of 6-inch clearance from all walls, and 12 inch minimum from top of device to the top of the ceiling. Devices larger than 2 inches being installed inside must have a minimum of 12-inch clearance from all walls, and 18 inches from the top of device to the top of the ceiling.

C. Devices must not be installed higher than 5 feet above the floor unless prior approval is obtained in writing from Harpeth Valley Utilities District and special provisions are provided for servicing and testing.

2.4. The pipe lines must be thoroughly flushed to remove foreign material and debris before installing the devices. A strainer should be added on the inlet side of the assembly before installation except for fire protection service lines. Fire protection service lines shall have an approved UL/FM fire line strainer.

2.5. If not already provided, high quality tight closing resilient seat shut off valves must be installed at each end of the device for testing and servicing purposes. A suitable test cock must be provided on the supply side of the valve on the inlet to the device.

2.6. Provisions must be made to protect the device(s) from freezing, vandalism, mechanical abuse, and from any corrosive, sticky, greasy, abrasive, or other damaging substance. If using insulating materials, they must not restrict the relief valve discharge, accessibility to test cocks or name place of the unit. Devices for domestic and fire lines must use an approved enclosure with heat manufactured by Hot Box by Hubbell, Safe-T-Cover by Hydro Cowl, Water Safe by G&C Enclosures, AquaShield, Windbreaker by CDR or Piedmont Well Covers.

A. For Irrigation Harpeth Valley Utilities District recommends that all backflow preventers installed outside use an approved enclosure with heat. Other approved means may be used to protect the device from freezing.

2.7. The relief valve must never be plugged, restricted or solidly piped to a drain, ditch or pump. Rigidly secured air-gap funnels may be used to direct discharges away from the unit provided an approved air-gap separation is provided at the relief valve discharge and again at the discharge end of the drain pipe. A secondary area drain may be required in most installations.

2.8. The test cocks, valve stems, and name plates should not be painted and their accessibility, operation or legibility shall not be hampered nor the relief valve discharge passage be restricted by insulation or other coverings.

2.9. The device must be adequately supported to prevent the unit from sagging. Special supports are required for units 4-inch and larger in size.

2.10. The Device(s) must be placed in the upright position in a horizontal run of pipe.

2.11. Adequate drainage should be provided for the relief valve discharge.

2.12. For applications where water temperatures exceed 110F (43C) only approved hot water devices are to be used.

2.13. Prior to completing the installation, verify that temperature pressure relief valves on heating vessels are properly installed and are in good working condition.

2.14. After installation, Harpeth Valley Utilities Districts Cross Connections Department must be notified to set up an inspection. This inspection is to verify proper installation and the testing of the backflow preventer.

2.15. All devices will be tested annually by Harpeth Valley Utilities District.

END OF SECTION

HARPETH VALLEY
UTILITIES DISTRICT

Consumer's Declaration to Nonexistence of Unapproved Cross-Connections

Harpeth Valley Utilities District (HVUD) would like to inform its existing customers, and customers who will be connecting to the public water supply, about unapproved cross-connections. "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 change-over devices through which, or because of which, backflow could occur are considered to be cross-connections

State Law prohibits existing and future connections to co-exist with the public water supply. HVUD has or will be making an inspection if your property has a well, cistern, spring, pool, irrigation system, fire system or any other non-approved water supply or water using equipment and you are connected or wish to connect onto HVUD's public water supply. This inspection will verify the alternative water supply or equipment has been disconnected or measures taken to ensure there is no threat of a cross-connection.

Consumer's Declaration

Complying with the provisions of Sections 68-221-101 – 68-221-108 of Tennessee Code Annotated which prohibits unregulated cross-connections, we do hereby declare that no cross-connections will be made as prohibited by State Law and by the policy of the Harpeth Valley Utilities District upon the premises located at:

_____

Property Address

and (we are, I am) the (owner, customer account holder) of said premises.

_____ _____

Print Name Customer Account Number

_____ _____

*Electronic or Signed Signature Date

***Consumer(s) may sign this document electronically by typing in the signature field above. As with handwritten signatures, by signing electronically, the Consumer(s) acknowledges and agrees to this Declaration. Further, the Consumer(s) agrees that the Consumer's electronic signature(s) has/have the same legal force and effect as the Consumer's handwritten signature(s).**

PLAN FOR CROSS-CONNECTION CONTROL
HARPETH VALLEY UTILITIES DISTRICT
OF DAVIDSON AND WILLIAMSON COUNTIES, TENNESSEE

I. INTRODUCTION

Preliminary surveys made at random on premises served by the distribution system indicate that, in an alarming number of cases, water is being used in a way that creates a threat to the health and safety of those depending upon the public water supply. Such hazardous water uses are defined as cross-connections, inter-connections, by-passes, and auxiliary intakes by Section 68-221-101 of the Tennessee Code Annotated. Section 68-221-104 of the Tennessee Code Annotated expressly prohibits the existence of cross-connections, inter-connections, by-passes, and auxiliary intakes. For convenience, all hazardous and illegal connections, as defined by Tennessee law, are referred to simply as cross-connections. Such illegal connections endanger the health and safety of all those depending upon the public water supply. With such cross-connections in existence, there is no way to insure that the customer receives safe water at all times. The Harpeth Valley Utilities District, therefore, recognizes the necessity of initiating and managing an ongoing program to detect and eliminate such hazardous cross-connections from the distribution system as a necessary means of protecting the quality of water being distributed.

The Harpeth Valley Utilities District recognizes that it is not reasonable to produce a safe water at the treatment plant and then allow cross-connections to exist which could contaminate the water being distributed to the customers. The Harpeth Valley Utilities District is dedicated to see that nothing happens to degrade the quality of the water within the distribution system.

The Harpeth Valley Utilities District is also dedicated to supplying a safe water to each and every customer under all foreseeable circumstances. The possibility of backflow due to improper use of water within the customer's premises is especially significant because, when this occurs, the potable water supply may become a transmitter of disease, toxic materials, and other hazardous substances. The only proper precaution is to eliminate all possible links whereby such contamination may occur. The officials of the Harpeth Valley Utilities District are determined to take every reasonable precaution possible to see that cross-connection are not allowed to contaminate the public water supply being distributed to its customers.

Realizing that cross-connections may exist in the distribution system, which could permit the backflow of contaminants into the distribution system (under certain circumstances), it is deemed important that an effective cross-connection control program be ongoing.

II. HARPETH VALLEY UTILITIES DISTRICT POLICY

The Cross-Connection Policy passed by the Harpeth Valley Utilities District on March 27, 1978 and Addendum 1 dated August 25, 2003 prohibits the existence of cross-connections within the public water supply. This policy is attached to this plan as Appendix A. It is resolved that provisions of this policy are to be strictly enforced. Section 68-221-104 of the Tennessee Code Annotated also prohibits cross-connections.

III. INSPECTION AND ENFORCMENT

All who depend upon a public water supply are threatened by cross-connections and should want to have such hazardous connections eliminated. Each individual can make a definite contribution to the correction of this problem.

The Harpeth Valley Utilities District has set up a section which has as its primary responsibility, the conducting of an ongoing cross-connection control program. Water department personnel will visit the premises of all customers considered likely to have cross-connections for the purpose of determining how the water is used within the premises. Where cross-connections are found to exist, they must be eliminated or properly isolated from the distribution system so as to prevent the possibility of backflow. Such action will include, where needed, a backflow protection device on the service line or the discontinuance of water service.

All backflow prevention devices used for the protection of the water system must be a model acceptable to the Harpeth Valley Utilities District and approved by the Tennessee Department of Environment and Conservation Division of Water Supply. Such devices shall be installed at a location and in a manner approved by the Harpeth Valley Utilities District and shall meet or exceed the minimum standards established by the Tennessee Department of Environment and Conservation Division of Water Supply. The customer who creates a cross-connection problem shall bear the expense of providing backflow protection. All premises which are considered likely to have cross-connections are to be visited on a regular basis. The goal of Harpeth Valley Utilities District is to make such inspections on a semi-annual or annual basis depending on the degree of hazard.

The personnel who will comprise the cross-connection section have received special training in cross-connection control work. The individuals have fundamental knowledge of hydraulic systems and of plumbing. Individuals involved in this activity are able to clearly communicate with the customers and explain fully to them the hazards of cross-connections and why positive action must be taken. Individuals in this activity have a minimum of a high-school

education. Special training courses have been provided for the individuals who work on the cross-connection control program.

IV. SCHEDULE OF INSPECTIONS

The following is a list of premises served by the Harpeth Valley Utilities District that are considered to have high hazardous cross-connections. These hazards are rated as Priority #1.

Item No.	Type of Premises	Hazard Code
1.	Medical Offices	AMEDI
2.	Animal Hospital	CANIM
3.	Funeral Home	CFUNE
4.	Water/Waste Water	CWATE
5.	Fire Sprinkler Class 3	FCL3
6.	Pump Water/Sewer	IPMPC

Harpeth Valley Utilities District serves the above establishments which are considered to have high hazardous cross-connections. These premises are inspected on a semi-annual (six months) basis.

The following is a list of customers who are suspected to have a lower degree of hazard than those listed earlier. These hazards are rated as Priority #2. These premises are inspected on an annual (1 year) basis.

Item No.	**Type of Premises**	**Hazard Code**
1.	Commercial	ACOMM
2.	Automobile Repair	CAUTO
3.	Bakery	CBAKE
4.	Cemetery	CCEME
5.	Church	CCHUR
6.	Day Care Center	CDAYC
7.	Dock	CDOCK
8.	Dry Cleaning	CDRYC
9.	Gas Station	CGASS
10.	Health Club	CHEAL
11.	Hotel/Motel	CHOTE
12.	Irrigation Commercial	CIRRC
13.	Irrigation Residential	CIRRR
14.	Laundromat	CLAUN
15.	Nursery (Plant)	CNURS
16.	Office – Business Park	COFFB
17.	Personal Services	CPERS

18.	Residential Continuous Care	CRESC
19.	Residential Multi Family	CRESM
20.	Restaurant/Bar	CREST
21.	School	CSCHO
22.	Swimming Pool	CSWIM
23.	Fire Sprinkler Class I	FCLI
24.	Auto Wash	IAUTS

V. PROCEDURES FOR INSPECTION

It is recognized that it is important to acquaint the customers of the Harpeth Valley Utilities District with the hazards of cross-connections and with as many of the details of the cross-connection control program as possible. Every effort to inform customers of the hazards of cross-connections and the details of the program for their control will be pursued.

During the investigation, a field sheet will be completed showing details of significant findings, and the corrective action which should be taken. The hazards which cross-connections pose will be explained in detail. It will be pointed out that a detailed report of the significant findings and recommendations will be mailed back promptly.

The finding of the investigation will be reported back to the water customer. Cross-connections found will be described briefly along with the recommended method of correction. Every effort will be made to keep the description of the findings and recommendations clear and concise but as brief as possible. The correspondence to the customer will indicate a willingness to assist the customer in working out any details with which he may have questions. A time limit for having the corrections made will be suggested in the correspondence. Time for making corrections will be thirty days.

VI. SCHEDULING RE-INSPECTIONS

Follow-up visits will be scheduled to see that the corrections have been made and to see that corrective measures are properly installed to provide the desired protection. Follow-up visits will be scheduled as often as necessary until all corrective action has been completed to the satisfaction of Harpeth Valley Utilities District.

If it has been necessary that a protective device has been installed on the service line supplying the customer, the device will be tested to see that it is functioning in accordance with the Standards set up for such units. Following this action, a re-inspection will be scheduled for approximately six or twelve months later due to the degree of hazard.

Where no cross-connections have been found, or where cross-connections have been eliminated to the water system's satisfaction, a re-inspection visit will be scheduled approximately twelve months after the last inspection. At that time, it will be necessary to make a thorough evaluation of each water usage within the premises to detect any cross-connections which might have been created between visits.

VII. PROTECTION AGAINST CROSS-CONNECTION HAZARDS

Where cross-connections are found, which pose an extreme hazard of immediate concern, the cross-connection inspector shall require immediate corrective action to be taken. In the case of non-compliance, immediate steps will be taken to discontinue water service. In such cases, water service will not be re-established until the necessary corrections have been taken.

In cases where there is less hazard, or less likelihood of cross-connections being instrumental in contaminating the system, a reasonable time period will be allowed for corrections. A reduced pressure backflow prevention device will be required on the service line serving all new commercial customers and irrigation systems.

VIII. TESTING OF PROTECTIVE DEVICES

It is absolutely essential that protective devices be tested on a regular basis if they are to be relied upon. The devices are mechanical in nature and can fail to meet the performance standards which have been set for them. Routine testing of the devices is essential for proper operation. Immediately after the installation of protective devices, they shall be tested to determine if they are functioning properly. The devices are to be tested on an annual basis, or semi-annual if high hazard thereafter.

The water system will maintain files which will indicate which devices are to be tested during a particular month. Detailed records of the test will be kept in the permanent files of the utility district water system.

Should a protective device be found defective (not meeting performance standards), it shall be repaired promptly and placed in proper operating condition. Following repairs, the device is to be tested again to prove that it is meeting performance standards. The owner of a malfunctioning device will be responsible for any repairs.

The Cross-connection Control Section of the Harpeth Valley Utilities District will have personnel who are trained to test protective devices. Since the water department is vitally interested in the proper performance of the protective devices, it will test the devices as needed, without cost to the customer.

Arrangement will be made for a mutually agreeable time for testing the devices prior to actually making the test. In all cases, the time which water service is interrupted will be held to a minimum in order to provide a minimum of inconvenience to the customer.

IX. RECORDS AND REPORTS

Detailed records are to be kept on each premises visited. These records will give a complete picture of the findings of investigations, progress in making corrections, and current status. Detailed records are considered invaluable to the water system in demonstrating that reasonable precaution is taken to see that safe water is being distributed to each and every customer.

Records which are to be kept include, but are not limited to the following:

1. Reports of inspections, recommendations, re-inspections, and corrective action taken
2. Correspondence between the purveyor, customer, health agency, plumbing agency, etc., concerning corrective action
3. A master list of all protective devices
4. Vital data on each protective device
5. Testing and maintenance reports on each protective device
6. A file system to call to the attention of the cross-connection control group when testing is due or when re-inspections of a premises are needed

DATE: _____

HARPETH VALLEY UTILITIES DISTRICT
OF DAVIDSON AND WILLIAMSON COUNTIES

BY: _____
PRESIDENT

BY: _____
VICE PRESIDENT

BY: _____
SECRETARY-TREASURER

BY: _____
MANAGER