



# CITY OF NORTH RICHLAND HILLS CONSUMER HEALTH DIVISION

## CROSS CONNECTION CONTROL & BACKFLOW PREVENTION

One observation commonly made during health inspections is the identification of cross-connections and the requirement for backflow prevention measures. The purpose of this document is to explain what cross connections and backflow are, and why it is important to control cross-connections and backflow.

A cross-connection is any temporary or permanent connection between a public water system or consumer's potable (i.e., drinking) water system and any source or system containing nonpotable water or other substances.

Backflow is the undesirable reversal of flow of nonpotable water or other substances through a cross-connection and into the piping of a public water system or consumer's potable water system. **When backflow occurs, contaminated water can be drawn back into the potable water system and create serious and sometimes lethal health effects.** For this reason, we must either eliminate cross-connections or install appropriate backflow prevention to keep the potable water system safe.



The safest and most effective way to prevent backflow is through the use of an **air gap**. An air gap is a vertical, physical separation between the end of a water supply outlet and the flood-level rim of the receiving drain. **This separation must be at least twice the diameter of the water supply outlet and never less than one inch.** The picture to the left shows an example of a correct air gap separating the drain lines from two ice machines from a sewer drain. An air gap is also required for food preparation and dishwashing sinks to prevent sewage from contaminating items inside these sinks. Air gaps are approved to protect against cross-connections which pose a high risk of creating a health hazard.

Sometimes, an air gap is not a feasible method to prevent backflow. In these cases, an appropriate **backflow prevention device** must be installed according to the health hazard present and whether backsiphonage or backpressure backflow will occur. The most common forms of backflow prevention devices are atmospheric vacuum breakers (AVBs), hose bibb vacuum breakers, double check backflow prevention assemblies (DCBAs), and reduced pressure zone principle backflow prevention assemblies (RPZs). Of these devices, only the RPZ is approved for use to protect against cross connections which pose a high risk of creating a health hazard.

Some backflow prevention devices can be tested to ensure they are working (i.e. DCBAs and RPZs are testable, AVBs are not testable). It is recommended that all testable backflow prevention assemblies be tested at least once per year to ensure they are working. **It is required that all RPZs connected to cross connections which pose a high risk of creating a health hazard be tested at least once per year.**

A licensed Backflow Prevention Assembly Tester (BPAT), licensed Master Plumber, or (in some cases) Licensed Irrigator are the only persons allowed to test or repair backflow prevention assemblies. In most cases, a licensed Master Plumber must remove, replace, or install new backflow prevention assemblies. Backflow prevention assemblies must be tested when they are installed, repaired, replaced, and once annually for assemblies installed on health hazards.

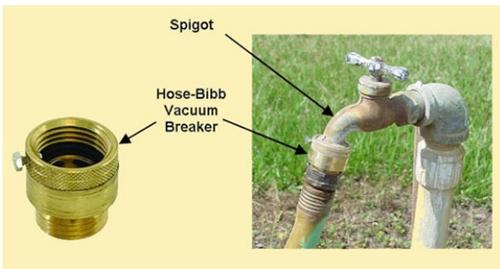


Figure 1: Hose Bibb Vacuum Breaker Example



Figure 2: Atmospheric Vacuum Breaker Example



Figure 3: RPZ Backflow Prevention Assembly Example

The table below gives a general overview of common cross connections and backflow prevention methods:

<b>Cross Connection</b>	<b>Issue Caused When Backflow Occurs</b>	<b>Possible Solutions:</b>
Garden Hose Dropped into a Swimming Pool	Water from swimming pool will be pulled back into upstream pipes.	Hose Bibb Vacuum Breaker
Compressor for Soda Fountain Connected to Potable Water	Carbon dioxide etches copper pipes, and water contaminated with copper is pulled back into upstream pipes, causing copper poisoning.	RPZ Backflow Prevention Assembly
Ice Machine Using Potable Water Has Outlet Pipe Placed inside Sewer Drain	Wastewater from the sewer drain can back up into the ice machine, contaminating the equipment and any ice inside the machine with disease-causing microorganisms. The machine can then contaminate the upstream pipes.	Air Gap (between outlet pipe and sewer drain). (Also advisable to install a DCBA or RPZ on incoming water line if ice machine is using filter).
Potable Water Being Used to Mix Chemicals in a Tank or Bucket via Hose or Pipe	Contaminated water from tank or bucket will be pulled back through the hose or pipe into the potable water supply.	Air Gap or RPZ are <u>only</u> safe and acceptable methods to prevent backflow.

**Questions about Backflow Prevention and Licensed BPAT Testers:**

- North Richland Hills Public Works: 817-427-6457
- North Richland Hills Planning and Permits: 817-427-6300
- North Richland Hills Consumer Health: 817-427-6650

**Additional Information about Backflow Prevention:**

- American Backflow Prevention Association ([www.abpa.org](http://www.abpa.org))
- Texas Commission on Environmental Quality ([www.tceq.state.tx.us](http://www.tceq.state.tx.us))
- USC Cross Connection Control Manual (<http://www.usc.edu/dept/fccch>)