



# HAMILTON COUNTY **PUBLIC HEALTH**

PREVENT. PROMOTE. PROTECT.



## *Protecting the Public Health through Plumbing Codes*

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# Hamilton County General Health District

## Hamilton County General Health District Department of Environmental Health Services

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## PUBLIC HEALTH AND PLUMBING CODES

The purpose of the Hamilton County General Health District is to work with the community to protect the public health and environment through education, inspections, health care coordination and data analysis. Health District employees work each day to assure that the citizens of Hamilton County are safe from disease, injury and contamination.

Restaurant inspections, vaccinations and birth records are more commonly known aspects of public health. You may not be aware that plumbing inspectors play an important role in protecting you against illness, injury, and even death, as a result of faulty or poor plumbing installations.

**Plumbing Codes and Public Health:** *Working together to protect your health and safety.*

- o Enforcement of the plumbing code assures the protection of persons against illness or injury.
- o Required plumbing permits, licenses and inspections assure safe plumbing installations.
- o Safe, clean water for human consumption and removal of sewage waste play important roles in the day-to-day health of our community.



In this booklet you will discover the relationship between public health and proper plumbing installation and design.

### 100 Years of Public Health Plumbing Codes

In the early 1900s, rapidly growing cities recognized the need for safe drinking water and proper disposal of sewage waste.

In Ohio, enforcement of the plumbing code was delegated to the Ohio Department of Health on July 1, 1917. Throughout the United States in the 1920s, indoor plumbing became the norm in most urban homes, helping to reduce illness and disease through the proper disposal of sanitary waste.



The plumbing boom in the first quarter of the 20<sup>th</sup> century also opened the door for poor plumbing installations and cross connections in the drinking water supply, leading to outbreaks of Typhoid Fever, Dysentery and other diseases in the 1940s. Today, cross connections and poor plumbing installations continue to create problems as modern cities and suburbs continue to grow.

Proper disposal of sewage waste is vital to public health, and best achieved through proper plumbing design, installation, and plumbing inspections performed by certified plumbing inspectors.



**What is considered plumbing?**

Plumbing is the piping design and proper function of plumbing fixtures for the safe delivery of drinking water and safe disposal of waste.

## WATER HEATER SAFETY

Water heaters are as common as refrigerators and washing machines in today’s household, but when a water heater needs to be replaced, always obtain the proper plumbing permit and inspection. Three critical items of concern are:

1. **Hot Water Temperature** – The hot water heater temperature should not be set higher than 125°. Scalding accidents among children and the elderly are common and it only takes a few seconds to sustain a third-degree burn.

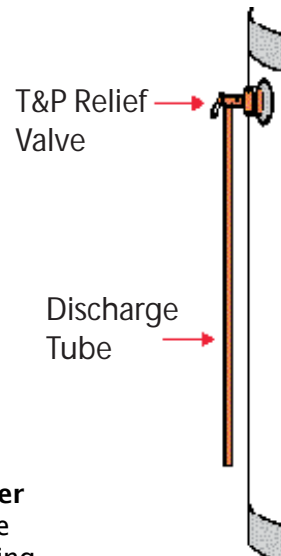
Temperature of Water	Time to Cause a Bad Burn
156°F (69°C)	1 second
149°F (65°C)	2 seconds
140°F (60°C)	5 seconds
133°F (56°C)	15 seconds

(Source: CDC)

Cincinnati Shriners’ Hospital recommends a maximum temperature of 105° for children and 100° for babies.

2. **Installation of Temperature and Pressure Relief Valves (T & P Relief Valve)** - A T&P Relief Valve is a safety device installed to relieve the water heater of excessive temperature and/or pressure. This device should:
  - o Have an inspection label from an approved agency
  - o Have a temperature setting of not more than 210°
  - o Have a pressure setting that does not exceed the tank or water heater manufacturer’s rated working pressure of 150 PSI (pounds per square inch), whichever is less

A temperature and pressure relief valve should be properly installed in the shell of the water heater tank, ideally submerged in the tank water located in the top 6 inches of the tank, to accurately sense the temperature. The discharge piping of the relief valve should be piped full size. The relief valve should be discharged to a place of safety, such as over a floor drain, ideally 6-8 inches off the floor to reduce personal injury, and where property damage will not occur.



- 3. Flue Installation on a Gas Water Heater**

An improperly installed flue can release carbon monoxide into your home causing serious injury or death. Always make sure the flue vent is free of debris such as leaves and animal nests. The flue should be inspected at least once a year and cleaned out as needed. When replacing a water heater, make sure the flue vent pipe is installed to the manufacturers specifications; always make sure the installer obtains a plumbing permit and inspection.



## BACKFLOW, BACK-SIPHONAGE AND CROSS CONNECTIONS

### What is backflow?




Backflow is the unintentional reversal of the normal direction of flow in a drinking water system that may result in pollution or contamination of the system by a liquid, gas, solid or combination.

When backflow occurs, the water drawn back into your main water supply may be contaminated. This contaminated water remains in water lines until it is drained from another fixture in your home. A serious health hazard could result when this contaminated water is used for drinking, cooking or bathing.

**What is back-siphonage?**

The water supply to your home is normally under pressure, but situations such as a water main break, repair of a water main, or water use for fire fighting can cause this pressure to drop. These low pressure situations can cause water to back-siphon. Back-siphonage is the reversal of the normal direction of flow in the piping due to a drop in supply pressure, a vacuum or a negative pressure in the supply piping.



Backflow Scenarios and Prevention Tips for Homeowners		
Scenario	Prevention Tip	
Soapy water or other cleaning compounds are back siphoned into your water supply via a faucet or hose submerged in a bucket or laundry basin.	Install an American Society of Sanitary Engineers (ASSE) 1011 approved vacuum breaker that permits manual draining for freezing conditions.	
Fertilizers/pesticides are back siphoned into your water supply via a garden hose attached to a fertilizer/pesticide sprayer.	Install an ASSE 1011 approved vacuum breaker that permits manual drainage for freezing conditions on outside spigots.	
Toilet tank cleaner/dye (blue color) is back siphoned into your water supply via a refill valve or ballcock without anti-siphonage protection.	Use only an ASSE 1002 "anti-siphonage" or "code approved" ballcock repair/replacement kit. Hardware stores sell both approved and unapproved fill valves.	
Bacteria/chemicals/additives present in a boiler system are back-siphoned into water supply.	Contact your plumber. You may need to install an air gap or an ASSE 1013 backflow device.	
Chemicals/pesticides/animal feces are drawn into your supply from a lawn irrigation system.	Contact your irrigation contractor/plumber. Lawn irrigation systems require a high hazard testable backflow device. These devices should be tested annually to ensure reliability.	

**What is a backflow device?**

Any device, method or type of construction that is used to prevent a backflow condition into a drinking water system.

**Why does the backflow device have to be tested yearly?**

Any device that is mechanical may fail and must be regularly checked and tested. According to Ohio Basic Plumbing Code, testable backflow devices are required to be tested annually.

**Who do I contact to test my backflow device?**

You can find a certified backflow tester in the phone book under plumbing contractors. Some lawn irrigation companies employ certified backflow testers as well. You should get bids from three contractors to test your device, just as you should with any other contractor you would hire.

**What is a cross connection?**

A cross connection occurs when pipes, fittings, fixtures and/or devices are arranged so that the public water supply is connected to a water system not approved for drinking. Backflow can occur in these types of situations, creating the potential for a polluted or contaminated public water source.

**What is the most common form of a cross connection?**

Cross connections commonly occur with ordinary garden hoses. Garden hoses connected to the drinking water supply are often attached to applicators that are used for a variety of potentially dangerous activities, including adding pesticides to gardens or cleaning outdoor surfaces.

**What can you do to protect your home?**

- If you have a lawn irrigation system, have the system's backflow device tested yearly.
- When doing plumbing repairs at home, know when to call in a professional and hire only licensed certified plumbers.
- Make sure the plumbing contractor obtains all required permits and inspections. You can search for a bonded and registered plumbing contractor on the Health District's Web site, [www.hamiltoncountyhealth.org](http://www.hamiltoncountyhealth.org).
- If you have any questions concerning permits, inspections or plumbing codes, call the Hamilton County General Health District at (513) 946-7854 or visit us online at [www.hamiltoncountyhealth.org](http://www.hamiltoncountyhealth.org).

## **PLUMBING RULES AND GUIDELINES PROTECT THE PUBLIC HEALTH**

### **Contaminated Shower Water**

In 1999, the Hamilton County General Health District received a complaint from a tenant of a four-family home. The water coming out of his shower was blue and it had irritated and burned his skin.

An investigation revealed that the apartment above the complainant had blue toilet bowl cleaner in the toilet tank and an unapproved toilet fill valve assembly installed.

Work on the water main in the street had reduced the water pressure in the apartment building, causing a back-siphonage in the main water line, pulling the blue water from the toilet tank through the unapproved toilet fill valve and into the building's water lines. The tenant below turned on his shower and the blue water came out of the shower head.

An ASSE 1002 anti-siphon code approved toilet fill valve could have prevented this backflow incident and the tenant's injuries.

### **E. coli Outbreak**

In 2000, 27 cases of E. coli 0157 were linked to contaminated water and ice used by food vendors at an Ohio fair ground. After traces of cattle feces, a known carrier of E. coli, were found in the water supply used by food vendors at the fair, a preliminary report from the Centers for Disease Control and Prevention theorized that standing water from animal barns had been siphoned into the water system.



Because water spigots on the fair grounds had no backflow devices installed, a loss in water pressure allowed the hoses lying in puddles to siphon dirty animal wash water back into the water supply used by vendors serving food and drinks. Vacuum breakers can be purchased for under \$10.00 a piece. (*Beacon Journal online 2000*)

### **SARS**

In 2003, improperly maintained floor drains and powerful bathroom exhaust fans combined to create a SARS outbreak at a Hong Kong apartment building.

Contaminated feces from an infected visitor at the complex entered the apartment complex's sanitary sewer system. Gases traveling through the sanitary sewer system entered bathrooms through dry floor drains. Overly powerful bathroom exhaust fans helped to pull sewer gas contaminated with the air-borne SARS virus out of the dry floor drains and circulated it through the complex.

When working properly, a floor drain has a water seal that prevents sewer gas from filling the air in a room. But when this seal - or plumbing trap - becomes dry, it allows sewer gas to escape into the air and be inhaled. When a floor drain is dry, escaping sewer gas usually creates a noticeable foul odor. Residents can maintain floor drains simply by pouring a quart of water down the drain when a foul odor becomes noticeable. (*Environmental Health May 06*)

### **Human Blood in Water System**

Reports of blood coming out of a drinking fountain in a funeral home led county plumbing inspectors to an aspirator (a machine used to remove fluids from the body during the embalming process) in one of the business's embalming rooms. The aspirator was directly connected to the funeral home's water supply system through a sink in the embalming room.



Water flowing through the aspirator created suction that drew body fluids through a hose and into the funeral home's water supply. The combination of low water pressure and suction created by the aspirator caused body fluids to be back-siphoned into the funeral home's water supply and threatened the public water system.

Proper backflow protection could have prevented the back-siphonage and protected the funeral home's drinking water supply. (*EPA Cross-connection Control Manual*)

### **Questions?**

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