

# YOUR HOME'S PLUMBING SYSTEM

By Tim Oglesby, Home Check America



Plumbing has changed significantly since the days when American's lived in 'little houses on the prairie'. Unfortunately, many homeowners don't know a lot about plumbing and are at the mercy of an honest, or not so honest, plumber. Most homes in the Chicagoland area have water supplied by the municipalities we live in. Some rural areas have private wells. Rarely we still see cisterns that collect rainwater from off the roof for bathing purposes (not potable water for drinking).

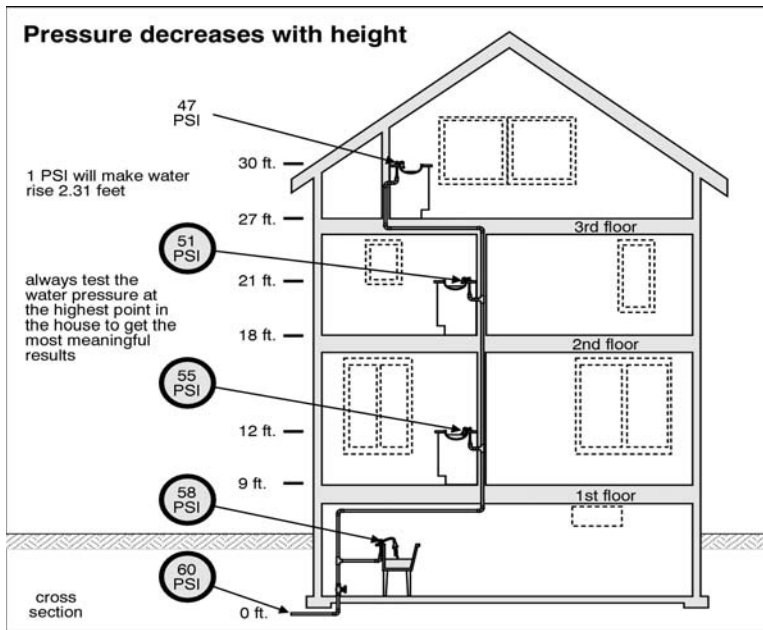
## PRIVATE WELLS

If you have a well, water is pumped up from the ground near your home. The well head is a metal plate on top of a large pipe usually about six inches round in the yard and sticking up from the ground about one foot. The pump can be located in the house or at the bottom of the well pipe. The depth of the well depends on the water table in the area. Contrary to common thinking, deeper wells do not always mean better water quality. Private wells should be purified by a well company or by the homeowner once a year. Consult with your local water quality official or well drilling company for more information on how to do this, it is not hard to do. Home inspectors do not test or inspect private wells, as they are inspected by the county health department. Homebuyers should request a report of the well inspection at or before closing.

## HOW WELLS WORK

Private wells pump water up from the ground through the well pipe and fill a pressure tank and then into the house supply pipes. The tank serves as a reserve of water keeping the pressure even, so that the well pump isn't working every time you turn on a faucet. When the water level drops below a certain level in the tank, the well pump fills it back up. The pump shuts off automatically when the pressure is reestablished.

Water flows to the tank at pressures between 25 to 80 pounds per square inch (psi). Typical water pressure in homes is between 30-50 psi. A main shut-off valve usually is installed on the pipe near the entry point in the house. You should know where this valve is in case you need to turn off the water to the house.



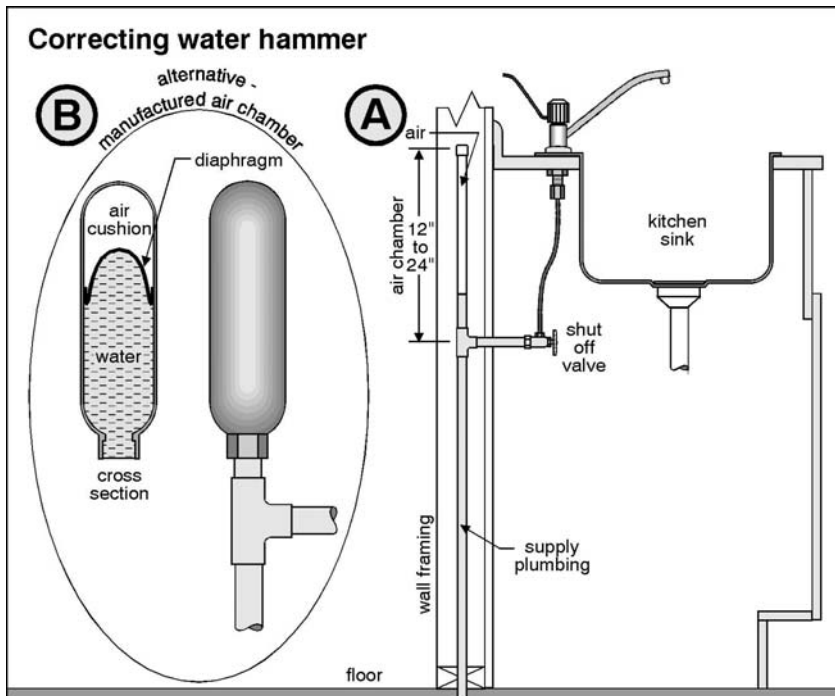
## CITY WATER

Houses on city water do not have pressure tanks or wellheads in the yard. Instead they have a water meter inside the house, usually in the basement or utility room. These water meters measure the amount of water used in the home. Years ago the city employed persons to be “meter readers”, but today most of this is done via telephone and remote reading devices. You will also need to become familiar with where the main water shut off valve is located. It’s best not to turn these valves if they are older as they may not open again.

## SUPPLY PIPES

Most pipes in homes today are copper. Some older homes have galvanized pipes, which is still an acceptable material. Supply pipes are the smaller pipes you find in a home. The larger pipes (usually 2”-4” white PVC, copper, galvanized, or iron) are drain and vent pipes and are part of the waste water system (more about those later). Water supply pipes that are white PVC plastic or cream colored CPVC plastic or gray plastic (polybuteline) are not recommended, not considered to code in most areas, and can be prone to leaking.

Supply pipes have designed air chambers throughout the home usually behind showers, under sinks, etc. They act like shock absorbers when faucets are rapidly turned off. Without these, the system could develop ruptures from the pressures created by water flowing and stopping suddenly. Occasionally these chambers become filled with water and you will hear the pipes banging and knocking sound when the water is turned off. This is called water hammer. Noisy pipes can be repaired with re-establishing or increasing the size of the chambers.



If your plumbing system is operating properly, water pressure should be consistent. For example, water coming out of an upstairs shower should not be significantly reduced when the toilet is flushed downstairs. Water pressure can be diminished if rust, corrosion, or mineral deposits have built up inside the pipes or the faucet nozzle screens. Check your faucet screens and showerheads first if you have lower water pressure.

Copper and galvanized pipes in contact with each other cause corrosion inside the pipes, called galvanic electrolysis. We see this often in older homes where well-meaning homeowners have made a plumbing repair and have not installed dielectric unions, which separate the two different metals and prevent the corrosion.

Occasionally we see brass or lead pipes. These are acceptable on drainpipes, but lead service pipes can be a health concern if the home has them in quantity. Many homes in our area have main lead service pipes that come into the home. These main service pipes are not usually a source of lead in the water, as water over time has established an oxidation seal from the lead inside the pipe. However all homes with lead service pipes should have the home tested for the presence of lead in the water. We cannot tell if a tree root or something else has disturbed this oxidation inside the lead service pipe to the home. Lead in water is a serious health hazard.

Regardless of the type of material used, the framing of the house must adequately support all plumbing pipes.

## **WATER HEATERS**

Most homes have gas-fired or electric water heaters. Tanks range in size from 30 gallons to 75 gallons. Some homes have more than one water heater. When you look at

a water heater, you are seeing a sheet steel outer jacket painted with enamel to prevent rust. Insulation is installed between the galvanized steel tank and the outer jacket you see. When a water heater leaks, it leaks at the inner tank or fittings area.

Each water heater manufactured in the United States is manufactured with a galvanized steel water tank. Therefore, dielectric unions (see above) are needed if copper plumbing supply pipes are used.

To guard against excessive temperatures and pressures, every water heater must have a temperature/pressure relief valve that automatically releases water when the temperature or pressure in the tank exceeds its preset limit. Water temperatures should be kept at least 110 degrees Fahrenheit to kill microbes, but not more than 140 degrees Fahrenheit to prevent scalding.

Inside most tanks are replaceable magnesium rods, also known as anode rods, are suspended in the water to attract corrosive electrolytes that would otherwise consume the tank walls. These rods can be checked and replaced periodically to preserve the life of your water heater. Generally they should be checked every four or five years. Homes with well water may want to replace this rod every few years.

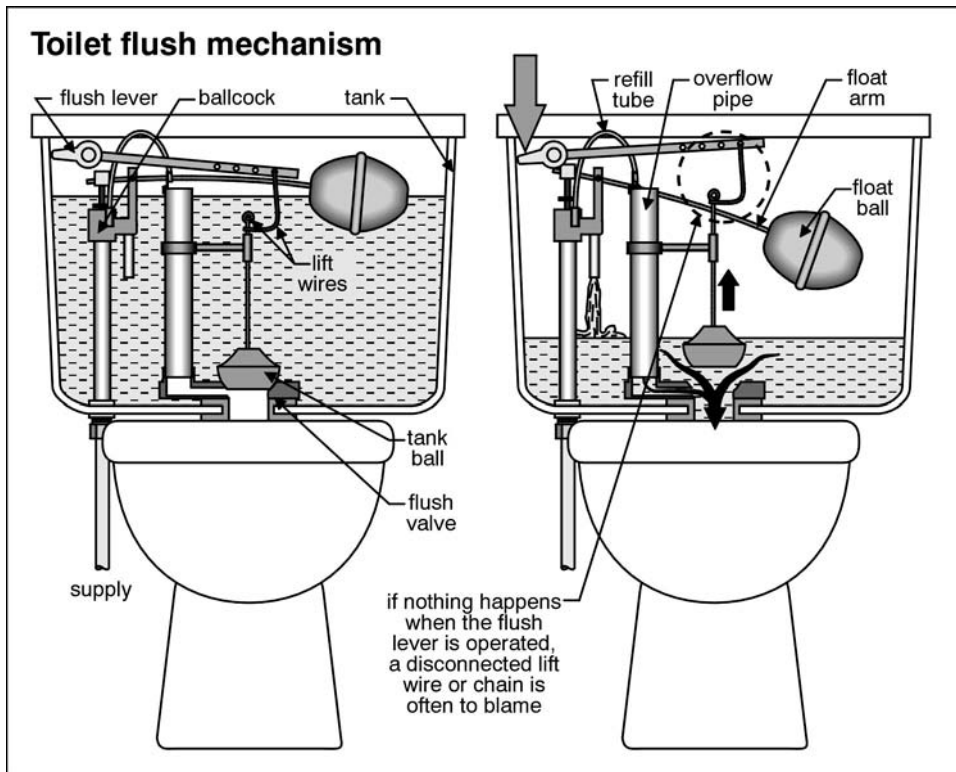
## **WATER SOFTENERS**

Home Check America does not inspect water softeners, as many are owned by a third party. Usually we see them when the home has a private well, as the water is usually hard. Hard water can cause calcium and magnesium buildups in the pipes and fixtures. It can leave rings around bathroom tubs and shorten the life of water heaters. Water softeners help remove these minerals and replace them with sodium.

## **TOILETS**

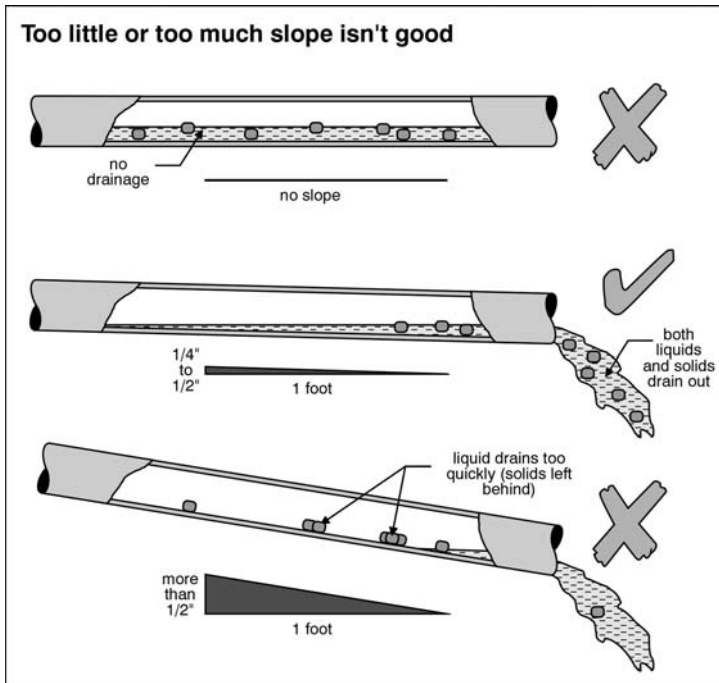
Ah, the royal flush. To most people, the workings of the toilet system seems complicated when they look in the tank. When the tank handle is pushed, the rubber stopper raises (called the flapper valve) and lets water from the tank rush into the toilet bowl and the tank's float ball drops with the water level. As water fills the bowl, gravity and a siphoning action swirl the water and it drops through the toilet trap into the drainage pipes under the floor.

When the tank water is released, the rubber stopper returns to the down position and seals the valve at the bottom of the tank. Water flows through a ballcock valve to refill the bowl and the tank. The float ball (can be on the fill stem also) rises with the water on an arm that shuts off the ballcock valve when the water reaches a certain level in the tank.

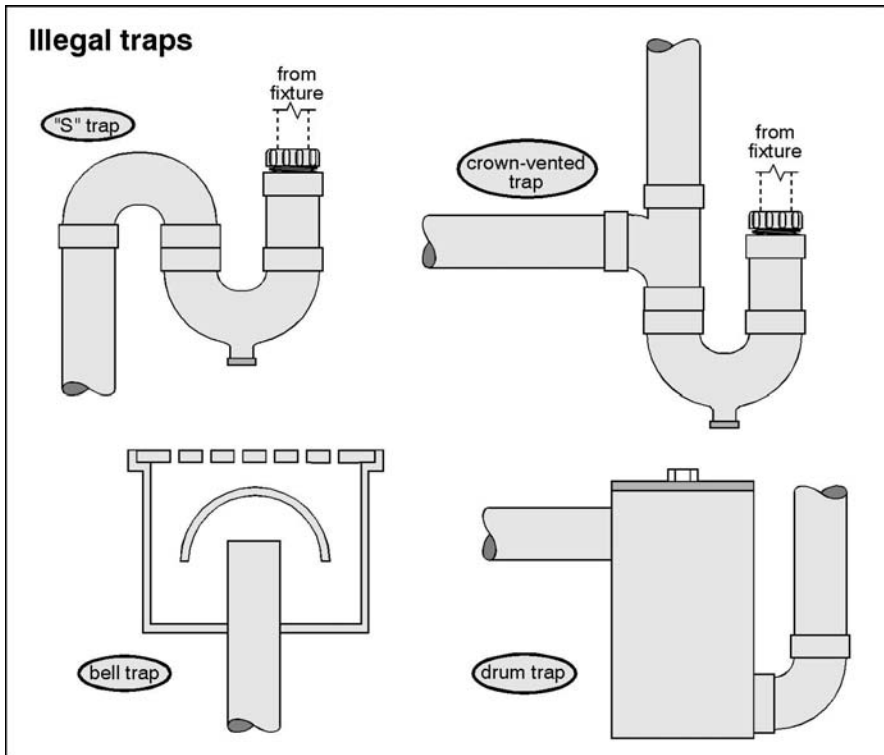


### **THE DRAIN-VENT SYSTEM**

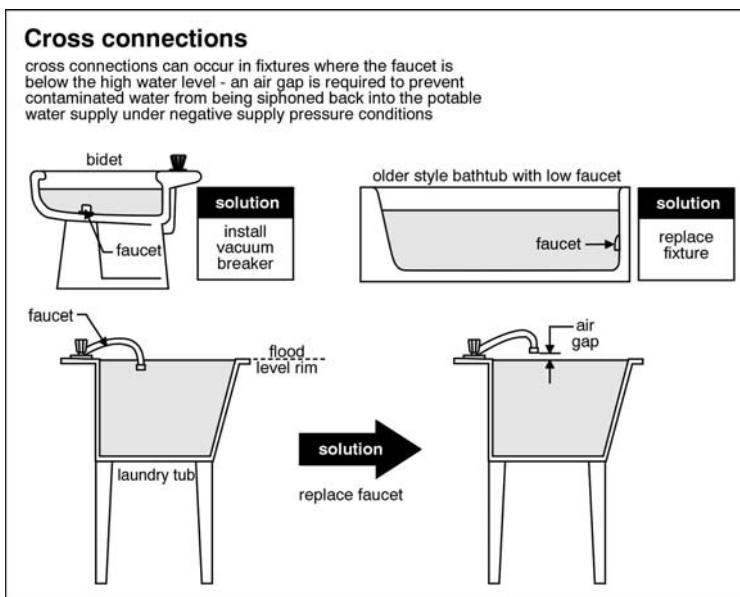
Used water and waste materials are carried via gravity through drain pipes to the public sewage lines at the street, or to a septic tank and field lines in a private sewage system. These pipes are sloped about  $\frac{1}{4}$ " per foot. As we all know, stuff doesn't flow up hill, so maintaining a slope throughout the drain system is important. Overflowing fixtures or slow draining wastes are signs that your fixtures or drainage systems should be checked. However, too much slope, like those pictured below can cause problems as well.



Decomposing waster materials in the sewage system emits malodorous and unhealthy fumes. These fumes can also be flammable. To prevent sewer gases from entering the home, each fixture's drain requires a U-shaped drainpipe called a "trap". A trap should always be filled with water to create a seal against pressurized sewer gases from coming back into the home. Venting is also necessary to maintain equal atmospheric pressure within the drain-waste pipe system and to safely dispose of sewer gases outside the home. Vent pipes are connected to the drain-waste system at each fixtures drain line, downstream from the trap, and extend outside of the house, usually from the roof.



A cross connection is any point where contaminated water, waste or liquid might mix with drinkable water such as the point where a sink or bathtub spout is below the flood rim of a fixture or a toilet ballcock valve is under water. These situations could present a serious health concern.



## PRIVATE SEPTIC SYSTEMS

Again, as professional home inspectors, there are very few things we don't inspect. Private wells and septic systems are two of them. The county health departments inspect

these. Consult them for more information on the workings of these systems.

## **SOME TIPS**

- + Check, replace or clean out your faucet screens and showerheads each year.
- + Clean pop-up sink and tub drains every month.
- + Never pour paint or chemicals down drains, especially if you have a private septic system.
- + Try to keep fat, grease and coffee grounds out of drains and dishwashers.
- + Flush the garbage disposal with one pot of hot water and a half cup of baking soda each month.
- + Make sure your sump pump is working and NOT connected to the waste system. This pump should also have its own dedicated electrical outlet.
- + Drain your water heater completely each year, and check the anode rod every few years.
- + Periodically check all fixtures, look for cracks, leaks or rust.
- + Note amateurish repairs with duct tape or caulk, these are prone to re-leak.

### **About the Author**

In 1984 Tim Oglesby unknowingly bought a home with significant defects. In 1994 he began Home Check America to assist new homeowners in NE Illinois. With a degree in business and masters in management, Tim was trained as a home inspector with Carson & Dunlop Engineering, was a general contractor for eight years, and is a licensed home inspector and real estate broker. He is a sought after public speaker and author on issues important to property management and home inspections. Contact: [www.homecheckamerica.com](http://www.homecheckamerica.com) or call toll free 1-866-245-4663. **Home Check America is responsible for the content of its articles and has no affiliation with the RE/MAX organization.**