

# REPORTER

## Tips for inspecting gas water heaters

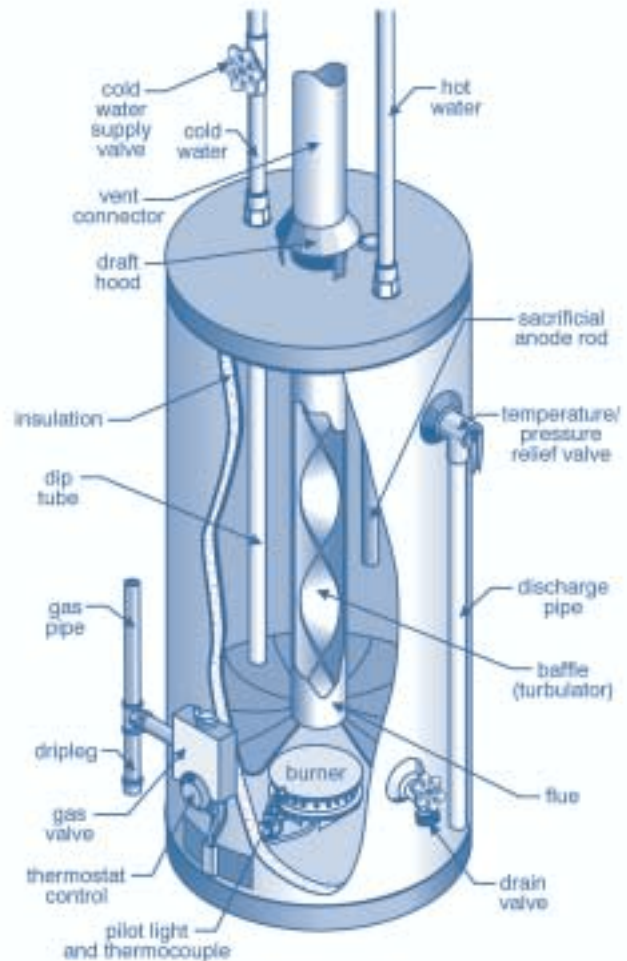
by Matt Bradfeldt, ASHI Member

**A**t one time hot water on demand may have been considered a luxury, but today's homebuyers expect it. But there's nothing about a water heater, especially a gas one, that home inspectors should take for granted. It's important to be familiar with the parts of a gas water heater, and to know what to look for as you inspect it.

**1. Cold Water Supply Valve** – this item is to control flow of water to the water heater. It should be a full bore gate valve or ball valve. Without a cold water shut-off, the water main must be used. Most areas require a cold water shut off within arms length of the front of the water heater.

**2. Temperature / Pressure Relief (TPR) Valve** – Inside the TPR valve is a spring loaded disc that will open should the temperature reach 210 degrees or the pressure reach 150 lbs. TPR valves are mandatory on water heaters. The correct location for the valve is within the top six inches of the tank. Some are top mounted; others are side mounted. Gas water heaters without TPR valves have been known to go through the roof of a home. Relief valves should also have a discharge vent line terminating near the floor. Some areas, however, do require them to be piped outside. In addition the pipe must be full-sized, usually three-quarters inch, and never threaded at the outlet end nor trapped in any way. If piped to a sink or floor drain, it must have an air gap between the outlet end and the rim of the sink or drain.

**3. Gas Line Shut Off** – Should an emergency arise, the gas shut off valve can be used to shut down the water heater immediately. It can also be used to shut off the gas for servicing or repairs. The inspector may want to barely turn the gas



valves, just enough to determine they are not frozen shut, but no more.

**4. Drain Valve** – Draining a few quarts off the bottom of the tank once a year (or as often as manufacturers suggest) may prolong the life of the

Bradford-White Water Heaters					
YEAR	YEAR	MONTH			
A	1964	A	1984	A	January
B	1965	B	1985	B	February
C	1966	C	1986	C	March
D	1967	D	1987	D	April
E	1968	E	1988	E	May
F	1969	F	1989	F	June
G	1970	G	1990	G	July
H	1971	H	1991	H	August
J	1972	J	1992	J	September
K	1973	K	1993	K	October
L	1974	L	1994	L	November
M	1975	M	1995	M	December
N	1976	N	1996		
P	1977	P	1997		
S	1978	S	1998		
T	1979	T	1999		
W	1980				
X	1981				
Y	1982				
Z	1983				

To determine the manufacturing date of a Bradford-White water heater manufactured in Middleville, MI, each unit is coded. The first letter found in the serial number indicates the year of manufacture, the second the month.

water heater. Over time sediment and sludge build up at the base of the tank. This sediment contributes to the deterioration of the tank and also prevents heat transfer. The drain valve is generally

not located directly at the base of the tank, so some sludge will remain no matter how often it's drained. The popping noises sometimes heard while a water heater is operating can most often be attributed to the sludge buildup. This sediment may also block the valve during testing, in which case it will need to be replaced.

**5. Thermostat Control** – The temperature of domestic hot water should not be above approximately 120° F to help prevent scalding. This corresponds to a dial setting of about halfway (needle pointing straight up.) Turning the thermostat all the way up could result in temperatures of approximately 180° F. Many newer gas controls have built-in stops to prevent thermostats from being set too high. This type of control is usually set at 140° F.

**6. Sacrificial Anode** – Water will always try to corrode something. In every water heater there is an anode, usually composed of zinc or magnesium, which will most likely corrode before the tank begins to corrode. Once this anode is completely gone or is removed, the tank will begin to corrode. Replacement of the anode is a simple process and can greatly increase the life span of the water heater. Sometimes it has to be removed and replaced with a rod of another composition because of the adverse chemical reactions to the rod supplied. All rods are not visible to the inspector.

**7. Baffle** – Inside the tank vent for the water heater is a helical shaped baffle. The purpose of the

baffle is to help deflect heat to the tank and increase the efficiency of the burning process. Often when carbon monoxide is discovered at the water heater it is because this baffle has fallen down into the flames at the base of the water heater.

The typical warranty for a gas water heater is five to six years. The year the water heater was manufactured can usually be determined by the first four digits of the serial number. The one exception to the age codes is on Bradford White models. They use the alphabet in their code. *See table.*

When it comes time to replace a gas water heater, the cost varies according to size and model, with the average \$300 to \$400 for a 40-gallon unit.

## INSPECTING

1. If the tank is in the basement, it should be located in an open area, with at least 30 inches of working clearance in front of the tank. Neither gas nor oil-fired water heaters are allowed in bedrooms, bathrooms, or closets. Water heaters located in garages are subject to numerous restrictions, including being installed with crash barriers or being placed on a platform at least 18 inches off the floor. In earthquake areas, the tank should be strapped.
2. Look at the tank for any signs of corrosion or blackened areas near the burner. Corrosion can be coming from a leak inside of the tank or from high moisture content in the area. Blackened areas near the burner are almost always from improper combustion or back drafting. Insulation blankets can be purchased to wrap water heaters, but when blankets are installed on gas water heaters, the fire hazard may outweigh the minor if any cost savings of the wrapping. Insulated covers on newer water heaters are worthless as far as insulation goes. More often than not they pose greater fire hazards because of the proximity to the draft diverter or the combustion chamber at the base.
3. View the piping connected to the water heater for any signs of corrosion.
4. Check for gas leaks using a combustionable gas leak detector. All gas-fired units should have a drip leg where the gas line enters the water heater. Flex gas line is allowed in some areas, not in others. You will need to know the requirements for your area.

**5.** Test the gas valve by barely turning it, just enough to make sure it isn't frozen in the off position. **DO NOT TURN THIS VALVE ALL THE WAY, AS IT WILL SHUT OFF THE PILOT LIGHT**, and do not light the pilot light for any reason. When the gas is already turned off, the only inspection possible is a visual one.

**6.** The draft hood should not be loose. It should be on-center.

**7.** View the vent stack for proper rise. There should be at least three screws per connection. View where the water heater vent joins the main vent stack. If joined in a horizontal portion of the vent, the connection should be at no more than a 45-degree angle. If joined in a vertical portion of the stack, the higher BTU appliance (typically the furnace) should be on the bottom.

**8.** By operating a nearby faucet, it's possible to get the burner to fire for testing without changing the setting. In this way, you avoid disturbing the control, and are able to test a plumbing drain. This helps prevent complaint calls from the home's current occupants about changes to the temperature setting on their water heater.

**9.** Once the water heater has fired, check for signs of back drafting using a powder puffer, match, mirror, or other method. All exhaust should flow up the exhaust stack, rather than back into the room. A draft test should be done with the furnace off

and with it on.

**10.** Test for combustible gasses or CO – No combustible gasses should be present. If using a CO tester, the level should be below one hundred PPM. The allowable limit in most areas is 400 PPM at start up and 100 after running for a few minutes. Nevertheless, anything over 50 may be evidence of improper combustion.

**11.** Feel the pipes on top of the heater – the pipe labeled "Hot" (left side) should be hot and the pipe labeled "Cold" (right side) should be cold. If the pipes are reversed, the water heater will operate at decreased efficiency. A 40-gallon tank could function like a 20-to-30-gallon tank, but some tank heat traps will restrict the water flow and prevent the unit from working at all.

A careful inspection of a gas water heater will take into consideration both functionality and safety. ■

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