

Corrosion threatens water heaters— can cause rusty and smelly water

Public water systems often receive complaints about rusty water, or water that has an odor. Often such complaints originate from a single user with no similar complaints from water system customers in the neighborhood. Frequently, the problem can be traced to the anode in a hot water heater within the home or business reporting the problem.

It is not unusual to hear a local plumber or homeowner complain that the anodes in water heaters “get eaten up.” But do they mean the hot water heaters or the anodes? And do they understand why the exterior metals on the anode were sacrificed?

The chemistry of water, combined with the high water temperature created by the water heater, create a corrosive environment that can attack the water heater tank. To prevent the tank from deteriorating, water heaters come equipped with an anode rod. The rods, also known as ‘sacrificial’ anodes, are made of aluminum, zinc or magnesium. These anodes have an inner core of steel. The anode attracts the corrosive elements, thereby saving the tank.

To maintain protection against corrosion, the anode rod should be inspected at least once annually, and more frequently if the water is more corrosive. The anode rod can be inspected by removing a hex-head nut located at the top of the water heater (see diagram at right). Once removed, the anode might consist of little more than a stub of wire, which is evidence that a new anode is needed. If the anode is not replaced, then the hot water heater will corrode, possibly producing red

or rusty water from corrosion that takes place in the tank.

Sediment at the bottom of the tank is the next biggest threat to a water heater. In a gas-fired heater, sediment reduces the efficiency of the burner, which increases the

Help resolve the problem

It is important for water systems receiving rusty or smelly water complaints to investigate them to try to resolve questions for their customers. First, it must be determined that the water heater in

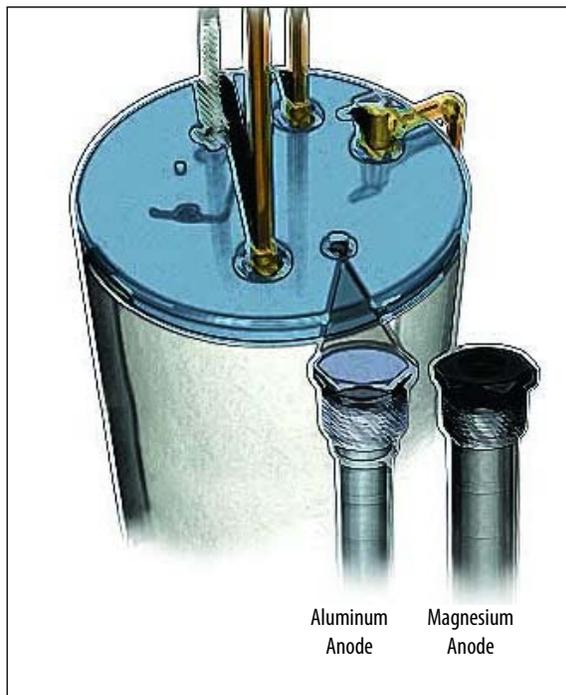
It is not unusual to hear a local plumber or homeowner complain that the anodes in water heaters “get eaten up.” But do they mean the hot water heaters or the anodes?

utility bill. Sediment also is a breeding ground for bacteria that can cause the hot water to smell like rotten eggs. Sediment also can produce a crackling or rumbling sound due to movement of the sediment and thermal expansion due to heating.

the house has not had the anode “eaten” away and that the anode has not been replaced. If the situation is that there is now no anode in the heater, then the problem may be due to the hot water heater not having an anode. The remedy is to install a new anode in the heater. A visit to

the location by a water department staff member and a plumber together might determine a lot to correctly identify the cause of the problem.

The rate of deterioration of an anode is very much determined by the water quality. By suggesting water quality, the reference is to the quality of the water before or after softening. Softened water is corrosive to any metal. The metal could be in the hot water heater, piping, faucets, or other plumbing. It is recommended to



Normal hot water heater anode location and the two most common types of sacrificial anode rods.

inspect the house or business to see what type of softener may be present. Is it a sodium or potassium chloride regeneration system? Is it a reverse osmosis system? Check to see if the type of softener in the house is used extensively in the area. Also, do neighboring homes or businesses have the same water quality problem or a lesser problem – and do those houses or businesses have a softening system? Are they the same type of softening system as the location having the problem?

Check to determine if the softening system is located before or after the hot water heater and whether this location is "standard practice." The softener is probably before the hot water heater.

The "rusty water" problem is caused by either: of the following:
 1) something particular or unique to the water system of the house or business with the problem; and/or
 2) something associated with the public water system's source water (wells or surface operation) and/or;
 3) the public water system's

distribution system. If other houses in the area are not having the problem, then the investigation should continue at the location of the complaint. If houses in the area are having the problem or having

water side or the cold water side, or both. Generally the suspicion is that or they have been told that the rusty water is present in the hot water only.

Depending on what is learned, investigations might then proceed

If looping is provided then provisions should be made to flush out the looped lines from either direction such as flushout at mid-point and shutoff valves in both directions from the flushout.

the problem to a lesser extent, then the investigations should continue in all locations.

Public water system staff should personally survey area houses and the particular house in question to determine the extent of the problem. The city or rural water system representatives could help answer the questions above by observing and taking samples of the rusty water. They could also confirm whether the rusty water is on the hot

on to include sampling the source water for iron and manganese. Also, the distribution system in the area of the problem should be reviewed for an aggressive flushing program and possible pigging. Also, water utility representatives could review the proposal for looping the distribution lines in the area. While looping lines has advantages such as better water pressure during higher water flow rates, looping lines can cause or exacerbate water quality problems such as rusty water. If looping is provided then provisions should be made to flush out the looped lines from either direction such as flushout at mid-point and shutoff valves in both directions from the flushout.

Again, well water is somewhat corrosive but all water is very corrosive after some type of household softening. Anodes in hot water heaters are "sacrificial" and protect the water heater from corrosion.

To recap, the investigation into the complaint should be in this order: 1) the "anode" matter; 2) the type of softener; and 3) the plumbing downstream of the softener. Grounding of electrical systems to plumbing may also exacerbate corrosion of piping that in turn can result in reducing water quality. The home or business with the problem should be checked for such concerns.

Utility Service Co.

I N C O R P O R A T E D



<p>FULL SERVICE MAINTENANCE PROGRAMS GASB 34 Compliant Interior and Exterior Painting, Repairs, Safety Accessories Inspections, Washouts, Disinfections</p> <p>WIRELESS COMMUNICATIONS SERVICES Antenna Site Management Antenna Installations Design Reviews/Project Management</p> <p>TAX EXEMPT FINANCING Asset Acquisition and Infrastructure Growth Extremely Competitive Rates No "Red Tape"</p> <p>NEW TANK SALES Expedited Delivery Any Style, Design, Capacity</p>	<p>CORPORATE OFFICE P.O. Box 1350 Perry, GA 31069 Phone: 800-223-3695 Fax: 478-987-2991 www.utilityservice.com</p> <p>TOM STECHMANN Liberty, MO Phone: 888-424-4188 • 314-420-4912 Fax: 816-628-6487 tstechmann@utilityservice.com</p>
---	--