

ROTTEN EGG ODORS AND THE HOT WATER HEATER

By David J Back

Marshall Engineering & Surveying – Columbia, Missouri

Your water heater may be a major contributor to your rotten egg odor problem. It could be the sole cause, if the odor is not also in the cold water. The rotten egg “fragrance” is that of hydrogen sulfide (H₂S) gas. This gas is not harmful at the concentration that occurs in you water system. It is just not desirable to wash with, or drink, water that reminds one of decay.

The rotten egg odor results from a natural process involving sulfur, a common sulfate-reducing bacteria (*Desulfuivibrio desulfuricans*) and corrosion. The corrosion releases electrons that provide the energy required by the bacteria to participate in the sulfate reduction reaction. You must inhibit the bacterial activity, or the corrosion rate, to control the odor.

Chlorine residuals help to suppress the growth of bacteria in the water distribution system. Increased bacterial activity not only causes odor problems, but also may accelerate the corrosion of unprotected water mains and household plumbing. The accelerated corrosion releases more electrons, which increases the activity of the sulfate-reducing bacteria and worsens the odor problem. Chlorine depletion and related problems are enhanced by the stagnant conditions of dead-end water mains and in small diameter household plumbing, where the bacteria can flourish. Other contributors may include infrequent use of hot water, iron plumbing and the water softener.

Water heaters can provide an ideal environment for the production of H₂S gas. The steel tanks are lined with glass to prevent corrosion. A long rod or anode (usually magnesium) is used to prevent corrosion of the tank where small cracks in the glass coating occur. The magnesium corrodes more readily than steel and releases an abundance of electrons that provide a protective film over the cracks in the glass (cathodic protection). The number of electrons may exceed that required to protect the steel. Excess electrons provide energy for the bacteria to produce the repulsive H₂S gas.

“ROTTEN EGG ODOR REMEDIES”

1. Replacement of magnesium anodes – The magnesium anode provides an abundance of corrosion protection, perhaps beyond the level needed, and may cause the rotten egg odor. Consult your water utility, a reputable water heater or plumbing supply dealer for a replacement anode that will provide adequate.
2. Kill the bacteria with increased heat – The sulfate-reducing bacteria thrives in the temperature range of most household heaters, which are factory set at 140 + or – 10 degrees F and are often further reduce to conserve energy, increasing the temperature to the high setting (160 degrees F) for several hours should kill the bacteria. **CAUTION:** Turn off the electrical power, or gas to be safe. The temperature setting must be reduced following treatment to prevent hot water scalding and to avoid high-energy cost.
3. Chlorination – Disconnecting with a chlorine bleach solution and flushing the tank to remove dead bacteria cells should eliminate the odor.