

Troubleshooting Ozone Water Treatment Equipment

This article will serve as a troubleshooting principles outline that will quickly and simply guide you through ascertaining, locating and fixing the problem.

Ascertain the Problem

A customer calls with an iron carryover. He is using an ozone system, which includes the ozone unit (ozonator), ozone injection system, off gas/air release tank and filtration.

Your job is to gather as much information as you can over the phone prior to dispatching your service technician. Certain questions must be asked. The customer invariably will help out in this department. Do not let his emotions sway you. Statements such as, "It never worked," have to be evaluated and given the credence based on the type of customer. Sometimes being a good troubleshooter involves a bit of psychology. You must hear between the words and keep the customer on track by asking specific questions. It is best to ask direct questions that require exact answers.

- Does the problem occur with the hot or cold?
- Where do you notice the problem?
- Is it isolated to one location?
- When did the problem start?
- How many people use the water?
- Does the water supply only the home?

The questions can be asked over the phone, which will give the technician some insight on where to go first when inspecting the equipment. This timesaver will be tremendous and the professional impression left on the customer will be invaluable.

Technicians should be trained to follow a set protocol from the time the customer calls until the service call is finished. Everything that has been discussed, checked and discovered is recorded on a service form. There is no such thing as having too much information.

Locating and Fixing the Problem

The tools you will need include a five-gallon white bucket, appropriate test kits, 200 psi gauge and a short hose to adapt to the backwash outlet fitting.

First, use your test kits (iron and pH) to test the water at the location the customer has indicated. Test the water immediately after the filter. This will determine whether or not it's the piping giving off accumulated iron. Then, test

Troubleshooting an ozone system is no different than troubleshooting any other water treatment system. The main principles apply; only the specifics change slightly.

the raw water to verify that the iron amounts are within normal parameters for the system installed. Finally, draw the treated water after filtration into the bucket. Is there any yellow color? Is the water milky/cloudy?

Once finished and you find 1.5 ppm iron both in the house and after the filter, the raw is the same as it was when the system was installed (3.5 ppm), the pH is 7.1 and there is no tannic acid (yellow color) or colloidal matter (milky cloudiness), then you've established that there is indeed a problem somewhere in the system that is unrelated to water quality.

You can save yourself a lot of time if you have an iron test kit that can test oxidized as well as unoxidized iron. This will indicate if the problem is located at the ozonator, ozone injector or filtration. This is a standard item for field technicians.

Let's move on assuming you do not have a ferric/ferrous iron test kit.

Equipment Checks

Ozonator. First, you must establish that the ozonator is producing the correct amount of ozone. Most manufacturers will have set guidelines and troubleshooting procedures to follow. Generally, there is an indicator light that is on when the ozonator operates. Check the inlet and outlet tubing and be sure they are securely fastened to the appropriate fittings. Loose fittings are air leaks. Air is a very weak oxidizer compared to ozone.

Testing for ozone residual is not a practical method of troubleshooting for two reasons.

- An accurate test kit on the market is too expensive, thus making it impractical as a diagnostic tool. The other is inexpensive but very inaccurate and cannot be relied on.
- Small-scale ozonators for home well water use are not designed to have an ozone residual detectable by the less expensive test kit.

It is not necessary to have a detectable ozone residual to oxidize iron, sulfur and manganese as it is with chlorine. While this is a benefit of ozone it makes troubleshooting slightly more difficult.

Checking for ozone injection. Once you've established that you are producing ozone you must be sure that the ozone is getting into the water. There are two methods of injecting ozone.

- **Ozone pump.** Positive displacement injector similar to a compressor. This device is easy to check. Simply disconnect all tubing, fittings or check valves from the outlet of the pump and connect a 200-psi gauge. A standard ozone pump must have a minimum of 80 psi. Consult the factory for details and service specifications.
- **Venturi.** This device creates a vacuum that sucks the ozone into the water. It is imperative that there is 100 percent suction through the entire well pump cycle (40 to 60 psi). You can check this by connecting clear tubing to the venturi's suction port. Take the other end of the tubing and dip it in/out of water. You will see water/bubbles rushing toward the venturi while the well pump operates. There always

should be movement/suction in the tubing while the well pump operates. If the suction stops at any time before the well pump stops, the venturi will have to be serviced or exchanged for a smaller model. Sometimes a booster pump will have to be added to increase psi and volume.

Air dryers. The use of air dryers is not mandatory and you will not find them on every ozone system in the field. The purpose of an air dryer is to remove the humidity in the air feed to the ozonator. Dry air produces more ozone and reduces service on ozone related equipment. You will not find a malfunctioning dryer to be the carryover culprit unless

- The dryer is restricted and not allowing air flow to the ozonator,
- The ozonator size with dry air is critical for the contaminates to be oxidized, or
- The dryer is passing moisture rather than removing it, resulting in an ozonator and ozone pump malfunction.*

Off gas tank (OGT) troubles. This device either is waterlogged and venting properly or air logged and letting air/ozone carryover. The customer complaining of continuous air spitting from the faucets notes this problem.

- Run water down line of the OGT and verify that there is a spitting problem.
- While the water is running, sound/knock on the tank. The tank should be completely full of water. If it sounds hollow or you can hear water splashing inside then the gas release device isn't venting properly.
- If it is full of water you will need to check for gas/water bypassing around the head as if the risor/baffle became dislodged.

Last stop ... filtration. Use your bucket and catch the first five to 30 gallons of backwash water. Let the bubbles rise. Can you see the bottom? If the media is fouled you most likely won't be able to see below the surface. The water might be discolored and dirty, but never so bad that you cannot read a quarter on the bottom. Problems associated with filtration occur from

- Insufficient backwash psi to raise the bed for cleaning.
- Water usage during the backwash cycle.
- Backwashing with the same muddy/slimy water that you've been filtering.
- Media loose during the backwash cycle. (This can occur if the OGT passes gas through it.)

What's wrong with the ozone system?

Occurrence of specific ozone system problems.

- 60%—Ozone injection problems.
- 10%—Filtration problems due to media fouling.
- 5%—Ozone unit malfunction.
- 25%—Misapplication (water usage, water quality)

- Insufficient backwash time and/or flow.
- Too much water usage between backwash cycles.
- Wrong media for the water quality.
- Another filter (softener) down line that was existing prior to installing the ozone system, which could be fouled and causing the carryover.

In Closing

Treat service calls as a new opportunity to make money and inform your customer of your potential. Plumbers never run away from service calls. They have set charges and everyone expects to pay for their time

and material. Water treatment customers are no different as long as they haven't been promised something that you the dealer cannot keep.

Proper troubleshooting techniques will save time and increase profit, and the professional impression left on the customer will be invaluable.

Remember:

- Don't make promises you cannot keep.
- Be punctual.
- Be professional in your dress, service truck, language and paperwork.

- Know your product and demonstrate technical prowess.
- Don't try to "fake out" the customer; seek answers from respected professionals when faced with questions you cannot answer.
- Inform your customers of charges prior to the visit.

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* *Important installation note: The ozone injection location must be between the well pump and the bladder tank if using the pressure switch to activate the ozonator.*

About the Author

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