

Case Study #1

Install Date – 5/8/2024

Rheem – Vertical System – Garage – AC Power – Dispense Interval Seven Days (requested by customer)

Background: This system was serviced three weeks before installation. The customer had three clogs last summer and has been pouring vinegar down the drain line every month (when he remembers). The entire system was elevated on a platform. The customer stated the platform was modified last year because the tilt of the air conditioner was incorrect, and the system was not draining properly.



Vacuuming out the drain line – there was bacteria in a quantity that was surprising based on the drain line just being cleaned out a few weeks ago.

That is a large quantity of Zoogloea, so right away I am thinking his line was not vacuumed out or there is something else going on.

Which there was...



This system is an “N” configuration with one coil on the left side which dispenses into one drain trough, and the other two coils form a “V” and share a common drain trough.

Cutoff switch directly in a drain outlet.

Spare drain outlet (ideal for install).

The output drain line had good slope and no trap as the filter at the bottom slides out, so a trap is not physically possible.

The underground line forms a “natural” trap and suffices (but not optimal) as the system trap.

The drain line has a cleanout port on the far right, which is capped, and the drain line has a 90-degree elbow downturn into the platform.

The drain line is moveable, so that means the drain line does not go down directly through the slab. The line turns toward the wall and then turns down through the slab. The exit outlet is on the right side of the house wall. The underground pipe is probably 8 to 10 feet long. The amount of condensate removed seemed to be the correct amount based on the configuration.





The Reservoir Holder was mounted on the upper cabinet to provide clearance in case the lower cabinet panel had to be removed in the future. The customer preferred the system being elevated.

This system had a spare drain outlet opening with a red plug as most Rheem air conditioners do.



The plug was removed and the 380mm (15") dispense tube was lowered behind the stationary panel to the drain outlet, and the tube was pulled out with a needle-nose pliers

The Combo Fitting was connected to the dispense tubing on the threaded side of the fitting.

The Combo Fitting was screwed all the way into the drain port until the fitting stops.





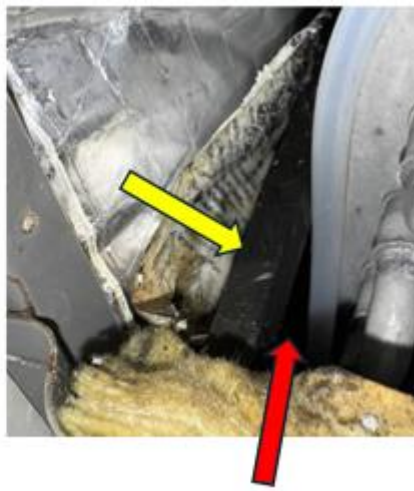
The dispense tubing from the pump was run on the SIDE of the cabinet so the tubing would not interfere with the cover.

The tubing was connected to the Combo Fitting.

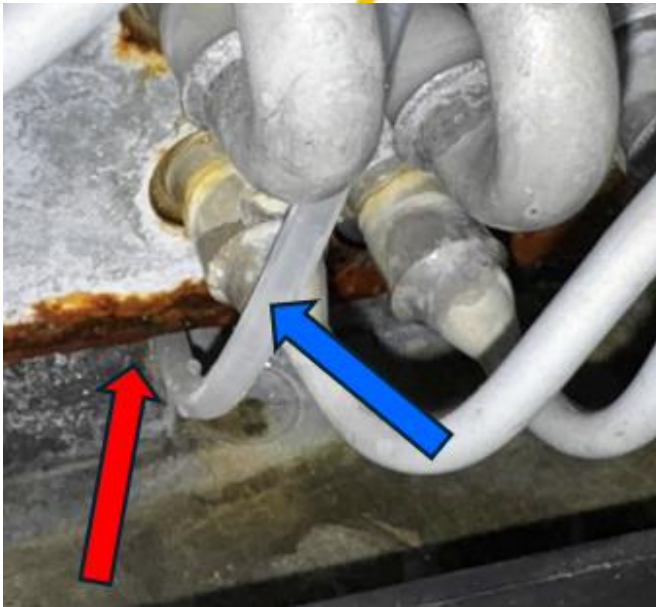
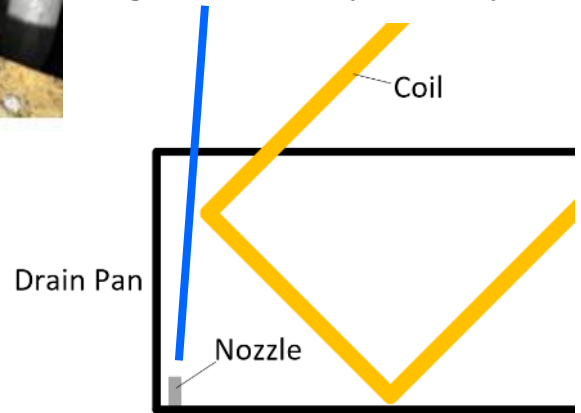


The dispense tubing was threaded through the coil aluminum tubes to anchor the dispense tubing, and the dispense tubing is brought to the center of the unit.

The two-port manifold was connected. (there is a shadow behind the manifold from the flash of the camera)



The left coil dispense tube was placed on top of the left coil. The placement wire was used to reach all the way to the back of the drain pan. The drain pan (yellow arrow) had a height side wall of about 2.5" which is perfect for placement of the Single-Port Nozzle (red arrow):

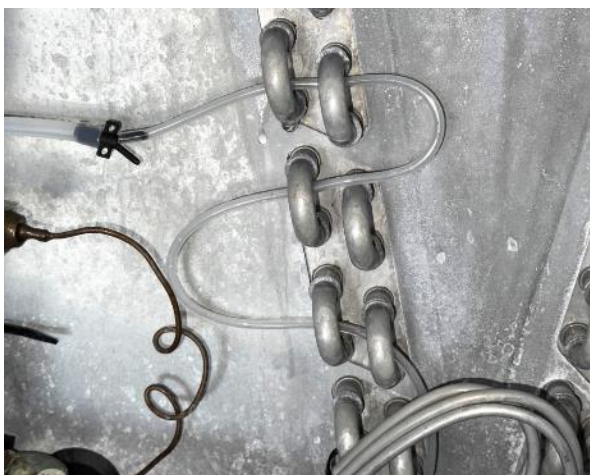


The second dispense tube (Blue arrow) was slid under the two coils in the common drain trough (Red arrow):

The nozzle was able to be inserted by hand and the placement wire was not required.

No wire ties were used to secure the tubing, so no chance to over-squeeze the tubing.

The 4mm (1/8") tubing was threaded through the coils to secure the tubing and connected to the two-port nozzle:



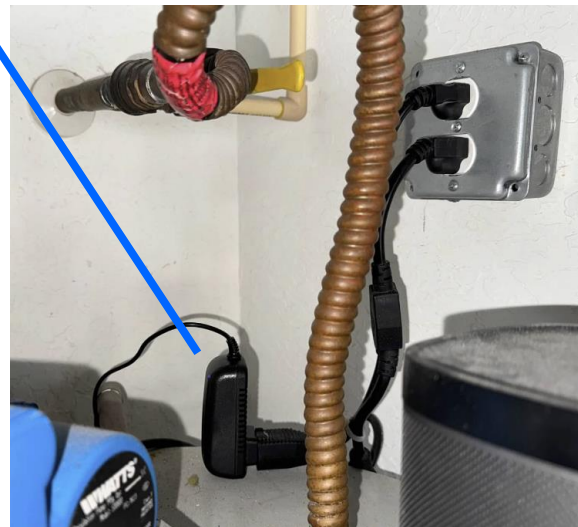
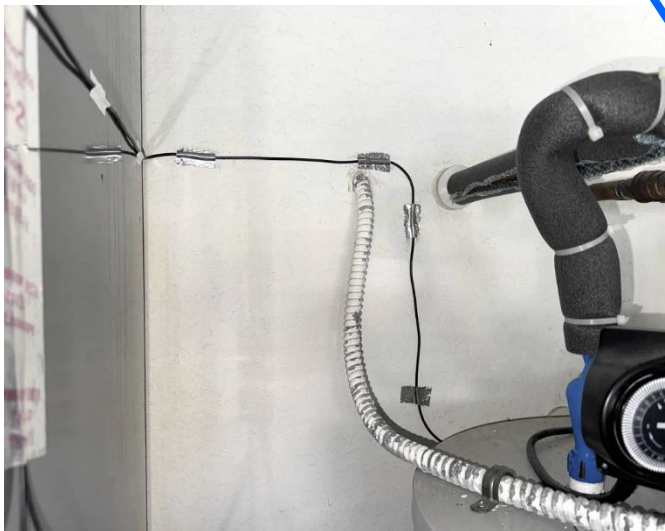


After placement, the filter opening provided visual access from underneath the system that the nozzle and dispense tube were secure in the drain trough and had not popped out while being inserted.

The nozzle and tube would be visible hanging from the trough if the tube dislodged while sliding in.

If using the placement wire straighten the wire before insertion as the wire can wander more in the trough and could pop out...

Power is from the AC Power adapter. The adapter was plugged into a “splitter” cord available by the water heater to the right of the AC unit.



Cut pieces of Aluminum tape were used to secure the cable.



Make sure the power plug is inserted all the way in as in the picture.

Next (with a step ladder) the tablets were added to the reservoir and a one-gallon jug was used to fill the reservoir with hot water.

The pump push button was pressed 2 times to initiate the seven-minute mixing cycle.

(To help dissolve and mix the Steramine tablets, the pump runs in reverse for seven-minutes pulling air into the nozzles and “blowing bubbles” in the reservoir.)

At this time (this is important) the dispensing tubes are watched to make sure no condensate is being drawn back into the tubing, which would mean in this particular case that the nozzle in the trough is submerged in condensate – which is a bad thing...

If there is condensate in the trough and the condensate is drawn into the dispense tubing, the nozzle will need to be placed in a different (elevated) location. With the “N” coil design, the Double-Port nozzle could be used and placed on the inside of the “V” and inserted into the fins the far back top of the middle coil (or as far back as the tubing will go. The Steramine will flow down the fins to the drain pan (this insertion method is detailed in the manual)

After the mix cycle completed two cups of Steramine were automatically pumped in which floods the system with an initial high dose of Steramine.

I thought I was done...

Looking into the drainpipe through the cleanout tube to observe the sanitizer flowing into the pipe, I could see bacteria down the pipe. Really?

This pipe is a vertical drop straight down into the platform and eventually routed outside.

I then took a brush which is on a long spring and pushed the brush into the drainpipe --- and the brush only went down about 8 inches (maybe there is a 90-degree elbow there?).



No...

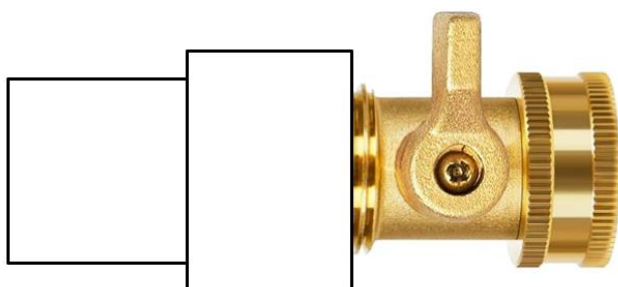
I then pulled out the brush and the brush was completely full of bacteria (yellow circles)

Packed with Zoogloea!

Here we go!

I proceeded to go back into the drainpipe about 12 more times and rinsing out the brush each time before I finally hit the bottom of the pipe. This length of the pipe was about 32 inches, so this entire vertical tube was almost completely full of bacteria. The AC company which serviced the system failed to detect the Zoog and

this is the reason that there was a high amount of bacteria when I vacuumed out the drain line then there should have been. Some of this glob's bacteria was dislodged.



As bad as this drain line was clogged I decided to flush the drain line with the hose using the hose fitting that I have put together (parts listed in section #4 of the manual). www.acdrainlinecleaners.com/manual

This drain line passes through the walls of the home, so care needs to be taken to start slowly and not add too much pressure too quickly. I started slowly with a strong trickle just to make sure there was water flow (no blockage) and then gradually increased the pressure and flow to the pipe to the point that it appeared the line was clear. But I vacuumed out the line again, flushed with the hose, vacuumed, and flushed one last time.

Why not? We want to start with as clean a drain line as practical and I was all setup with the hose so the process was easy to repeat.

A generality - Flushing a system with a hose – while there are some things to pay attention to - is the best way to clear a line as the water has power to force out the Zoog.

I also decided to cut the pipe on the outside of the house where the pipe was coming up from the ground so I could put the brush in the pipe, also assuming possibly another vertical pipe may be clogged. The brush went to the bottom directly/smoothly. The length of the pipe was about 30 inches due to the slope of the underground drainpipe from the AC handler to the outside.

When I retracted the brush there was a small amount of bacteria on the brush but minimal overall, similar piece of bacteria like I initially vacuumed out. I inserted the brush two more times and no bacteria came out.

At this point I am calling the pipe as clean as I can get with what I have.

I then used a coupling to connect the outside pipe back together again. Adding the coupling will also make it easier if the pipe needs to be opened just for checking for bacteria.

The ZoogOut was attached to the cabinet.

And one more task, the drainpipe was not insulated and has dripped water – so I insulated the drain line.

The customer also requested to have a seven day dispense interval instead of the default 15-day interval. His decision was based on all the previous clogs and seeing that the drain line was almost completely clogged again. The customer said he would gladly refill the reservoir in six months if his system never clogs. He said he will occasionally vacuum out the drain line with the ZoogOut vacuum adapter for additional insurance.

Lessons Learned:

Initially vacuuming out the drain line and seeing a high amount of bacteria after a previous three-week servicing raised a “yellow” caution flag in my mind, but the amount of condensate was correct based on the design and length of the underground drainpipe. I had a hunch something was amiss but didn’t know what.

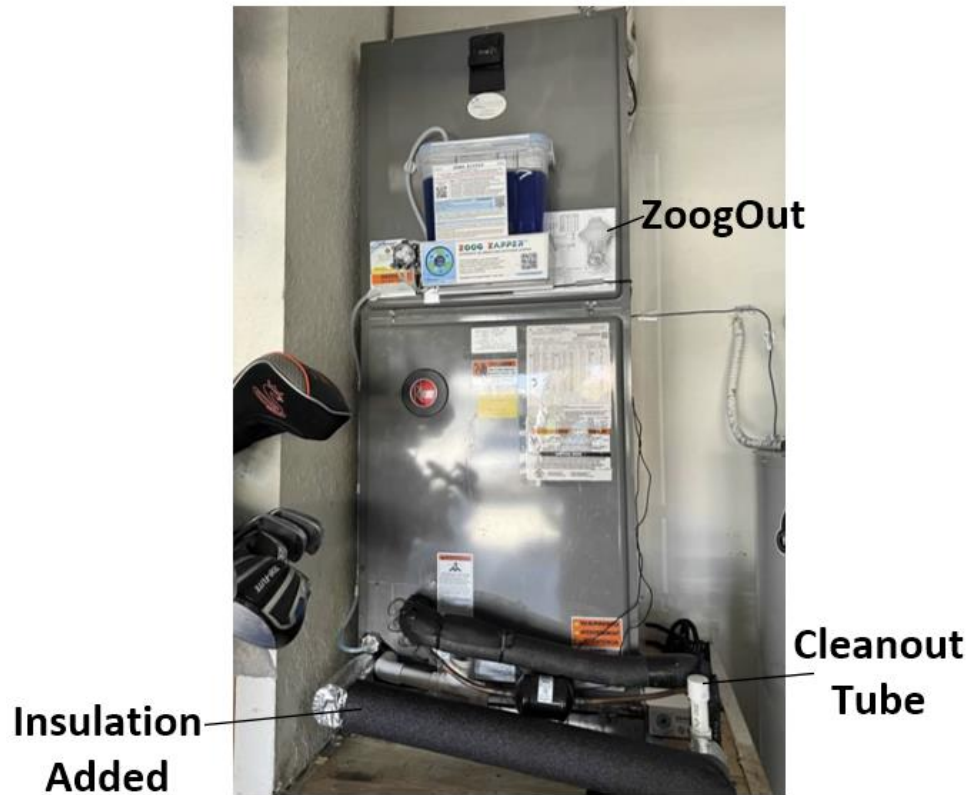
Only after peering down into the drainpipe by the unit and seeing bacteria did I find the issue, which then started the extensive clean/flush process.

The drain line would have clogged again probably based on the sheer amount of bacteria in the pipe.

The AC service tech vacuumed the drain line, saw an ample amount of condensate and bacteria, and called it a day. I don’t know what else the tech did for the servicing.

The lesson - what is best to do before installation of the Zoog Zapper is to use a hose and flush the system if possible. That way the system is installed on a relatively clean drain line and the Zoog Zapper will then operate to ideally prevent the bacteria from being able to grow again. The wildcard in any installation is the current amount of bacteria inside the tubing which can’t be reached or seen.

And with the ZoogOut vacuum adapter provided (<https://acdralinecleaners.com/zoogout>), the drain line should be vacuumed out every three months for additional preventive maintenance.



Another successful Zoog Zapper installation! Total time 1.5 hours (extensive cleaning)