

Case Study #2

Install Date – 5/6/2024

Manufacturer – Carrier - Horizontal System – Attic – AC Power – Dispense interval fifteen days (default)

Background: This system was serviced 4 weeks before installation. When I arrived at the house I noticed that paint had peeled off all around the air vent that was next to the attic stairway. Too much condensation looked like on the grille.



Vacuumed the drain line. Since this is an attic installation there was only a small amount of condensate due to the slope of the attic drainpipe, then a vertical drop from the attic down to the exit port. There was some Zoogloea at the exit port couplings and some Zoog visible on the ground.



I went up into the attic.

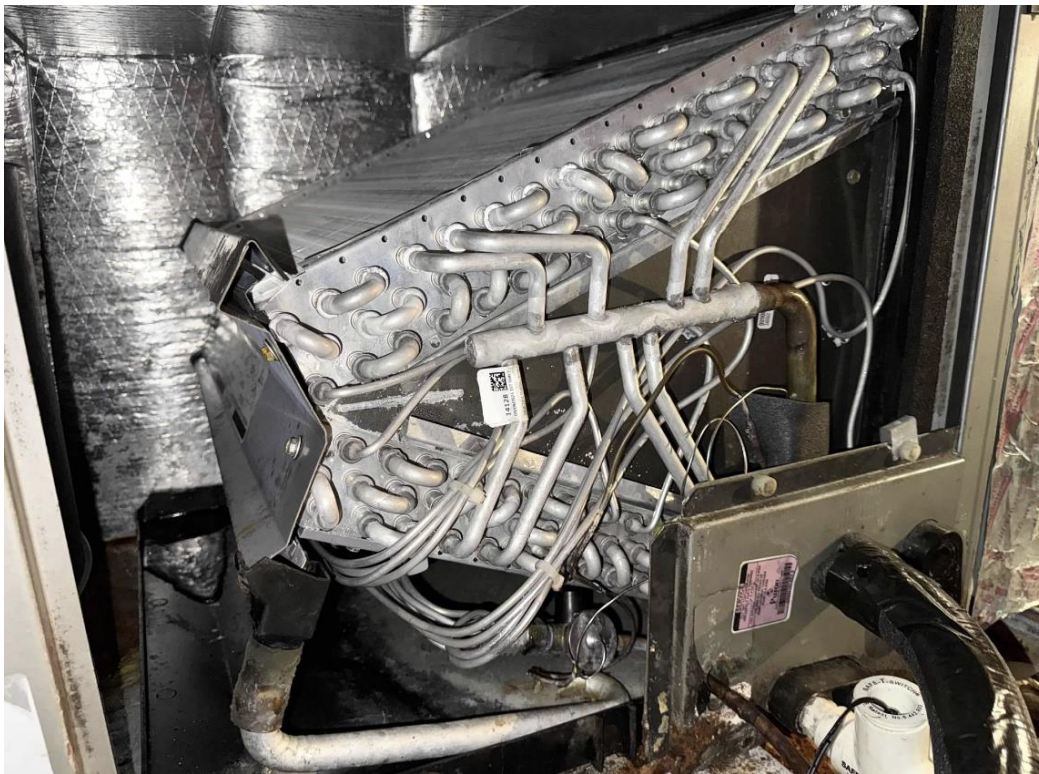
The secondary drain pan is very rusted.



The sides of the panels have excessive rust.

Looks like a water “issue” here...?

Took off the right panel – all aluminum evaporator coil:



I notice the back left corner of the drain pan has standing water? (yellow circle):





Looking to the left of the drain pan, the floor of the unit has **standing water**, about $\frac{1}{4}$ " deep.

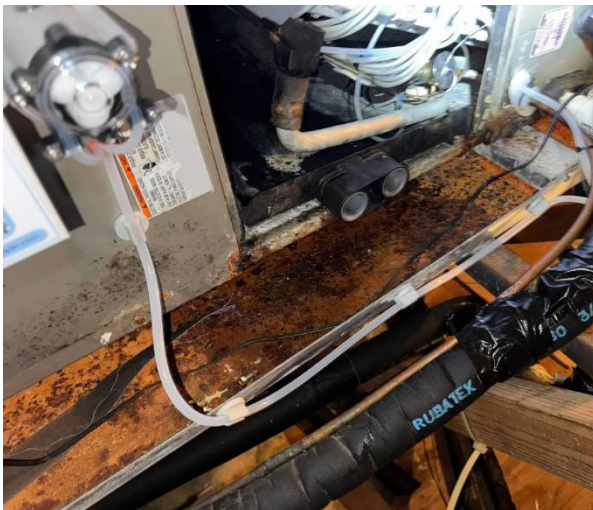
Notice the metal bars are rusted!



My assumption is that the pitch of the drain pan/cabinet is incorrect, and water is overflowing the left back corner of the drain pan and spilling down to the floor of the cabinet.

The water on the floor is below the blower, and this could/would explain why the ceiling vents all had water exiting and soaking the ceiling causing the paint to fall off. The blower is sucking up water and blowing water out the vents (all the vents on this system had peeling paint).

The water on the cabinet floor also drains/seeps out continuously from the gaps in the cabinet seams and is causing rusting in the secondary drain pan and on the unit:



Also, there was a large amount of bacteria on the drain pan, more of a film of bacteria.



Looking closer, the drain pan contained a large “puddle” of water – so instead of the condensate flowing out of the drain pan, the water is always residing in the drain pan (yellow circle):

The bacteria covered the drain pan from the circle all the way to the drain trough on the far right and to the drain outlet. This area also was submerged in condensate – the “puddle”.

There should not be standing water in the drain pan and again the assumption is the drain pan is not pitched properly.



This picture shows the bacteria and there is actually water covering the bacteria, but it's difficult to discern the water.

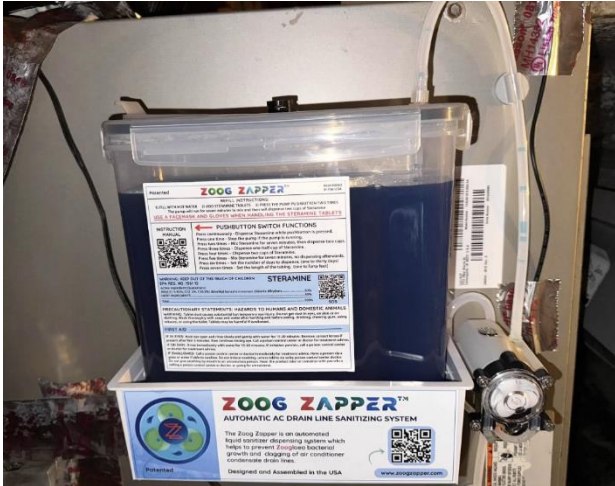
Based on the assumption that the system is not pitched properly, I placed a 1” PVC pipe cap under the back left corner of the drain pan to raise the pan to increase the pitch, this reduced the water in the far-left corner.

I also modified the hangers to increase the overall pitch of the cabinet, which did help to reduce the puddle size, but did not eliminate the puddle. There was a limit on how far the lower front right corner could be lowered as there were straps supporting the ductwork. On the backside of the cabinet, I raised the adjusting nuts until I ran out of thread, which was about a ½” increase only in height.

The unit needs to be set properly for even better drainage, but at least the system will now not overflow the drain pan and the condensate puddling should be minimized in the pan.

Time to install the system!

The Zoog Zapper was placed on the cabinet on the left panel:



The entry point of the dispense tubing was the standard oval opening with the rubber plug, except there was no rubber plug – just a hole.

Really?

On a unit that was recently serviced. You would think that a consciousness tech would seal the hole with aluminum tape...

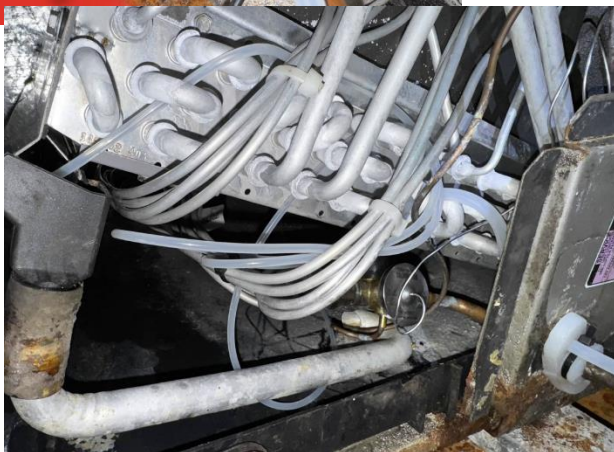
Or maybe never looked at the unit?



The rubber grommet was used (a previous version of the plug was used which is white urethane, the new version is black rubber).

The grommet is designed to cover the oval whole completely.

The 5mm tube connector was used to connect the dispense tube from the pump to the internal 380mm (15") dispense tube.



This unit has a tube from the coil connection plate down to the drain pan, and there was Zoogloea growing at the exit of the tube.



The decision on nozzle placement was to put one tube with the Single-Port nozzle into the channel of the connection plate.

The nozzle was slid in by hand to the end of the channel/trough.

The Steramine will flow through the entire channel and down into the tube which should prevent the bacterial growth at the exit of the tube.

The second nozzle location was in the far-right back corner of the drain pan and the Double-Port Nozzle was used since there is some condensate in the drain pan with the puddle. The Double-Port Nozzle is less prone to submersion by the design of the nozzle.

The placement wire was needed to reach to the far back corner.



This completed installation of the two nozzles.

Power – there was an attic light that had an AC outlet built in, but the outlet already had an AC power adapter plugged in. A two-prong extension cord was used so the existing AC adapter and the new AC Power adapter for the Zoog Zapper could both be connected to AC power.



Aluminum tape was added to the extension cord plug to make sure the cord would not easily come out of the socket.

With the ten-foot length of cable the AC Power adapter wire was long enough to reach the pump.

Filling the Reservoir

The Steramine was added into the reservoir and the reservoir was filled to the top with hot water using a one-gallon jug.

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 while the pump is running in reverse and drawing in air (this is important) the dispense tubing is watched to make sure no condensate is being drawn back into the tubing. If condensate is being drawn into a nozzle instead of air that means one or both nozzles are submerged in condensate – which is a bad thing...

If there is condensate in the dispense tubing the nozzle in the trough will need to be placed in a different location as there is some condensate existing in the drain trough. In this case there was no condensate being drawn into the tubing so nozzle placement was good.

After the mix cycle completed two cups of Steramine were pumped in.

The right panel was re-installed.



The dispense tubing was routed along the secondary drain pan using the magnetic tube holders.

Pictures of the installation were given to the customer so the AC company could be contacted to come and orient the cabinet to make sure the pan is tilted properly. The existing water on the cabinet floor was vacuumed out best I could, and the rest will evaporate now that condensate should no longer be overflowing the drain pan.

Lesson(s) learned – There are telltale signs usually that something is amiss with an installation, in this case excessive rust in the drain pan. Once the system was opened, the water in the bottom of the cabinet was the culprit – and why didn't the AC company find this when they were called about the paint peeling from around the vents??

Another successful Zoog Zapper installation!

Total time 1.2 hours.

Extra time was needed to adjust the pitch and tilt of the cabinet and vacuum out the excess water.