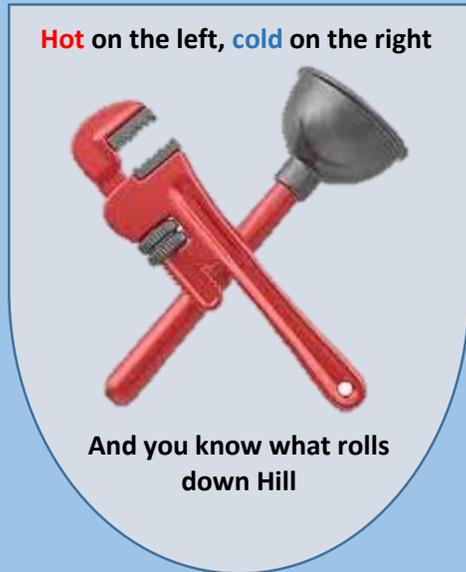
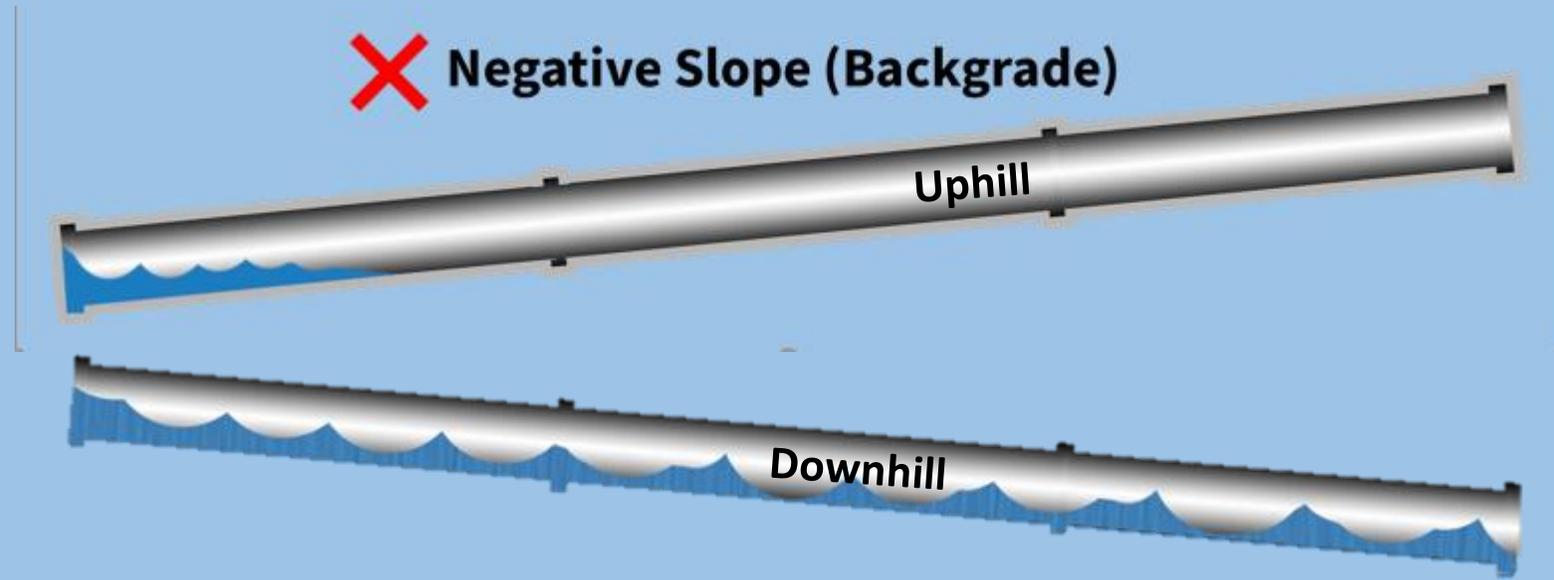


It's Crucial to Set Up Condensing Furnaces So That NO Condensate Can Build Up Anywhere in the System From the Secondary Heat Exchanger to the Exit of the Vent Pipe from the building

Technicians need to understand that the draining of condensing furnaces to prevent water build up is as important as the correct line volt, gas piping capacity, venting, etc., because just like if these item are wrong, incorrect drain procedures will cause furnace operation issues.



The last part of this old plumbers joke can be applied to the draining of condensate from condensing gas furnace drains and vents. They must have a certain amount of pitch towards the direction you want the water to move in. Have you ever see water move up hill without something pushing it? Me neither.



Furnace Leveling

- Leveling ensures proper condensate drainage from the heat exchanger and inducer draft blower.

- Level Horizontal units lengthwise from end-to-end for proper flue pipe drainage.

- Level Vertical units from side to side to prevent trapping of water in the secondary heat exchanger



Note: the trapping of small amounts of water in the secondary heat exchanger will cause your CO readings to soar upward.



Furnace Leveling

Horizontal:

Install the furnace with a slight tilt from back to front with the access doors downhill from the back panel.

- Tilt approximately 1/2 to 3/4 inches.
- The slight tilt allows the condensate from the secondary heat exchanger to **flow forward to the recuperator coil front cover**, and into drain trap.



Vertical Installations:

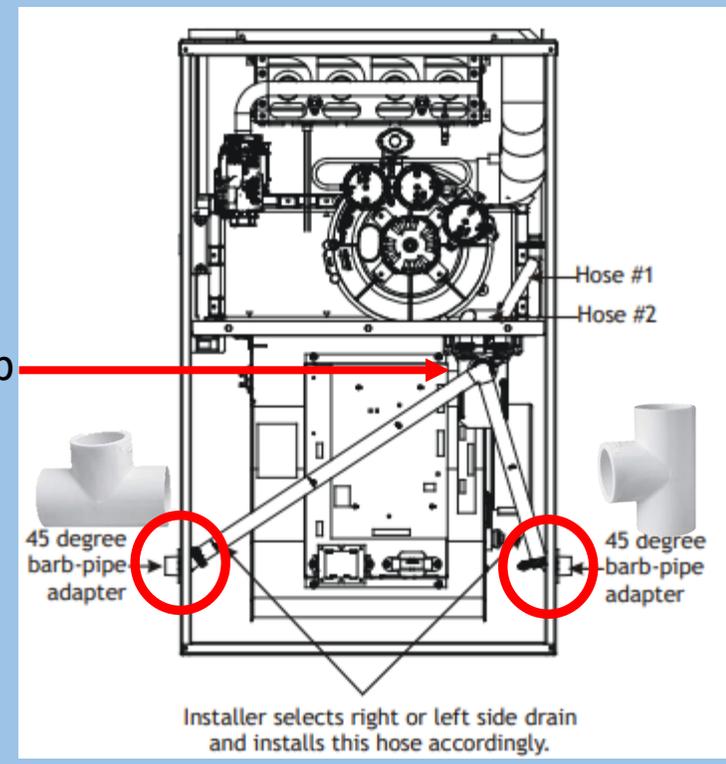
Install the furnace with a slight tilt from back to front. This allows the condensate from the secondary heat exchanger to flow forward to the recuperator coil (secondary heat exchanger) front cover, and into drain trap.

Use a piece or two of drive stock or wedges made of non-combustible material under each back corner to accomplish this



Install a PVC tee on the 45 degree barb-pipe adaptor with a 1" to 2" standpipe to prevent vacuum lock on the drain trap

The PVC tee can be installed either of the ways show in the picture to the right



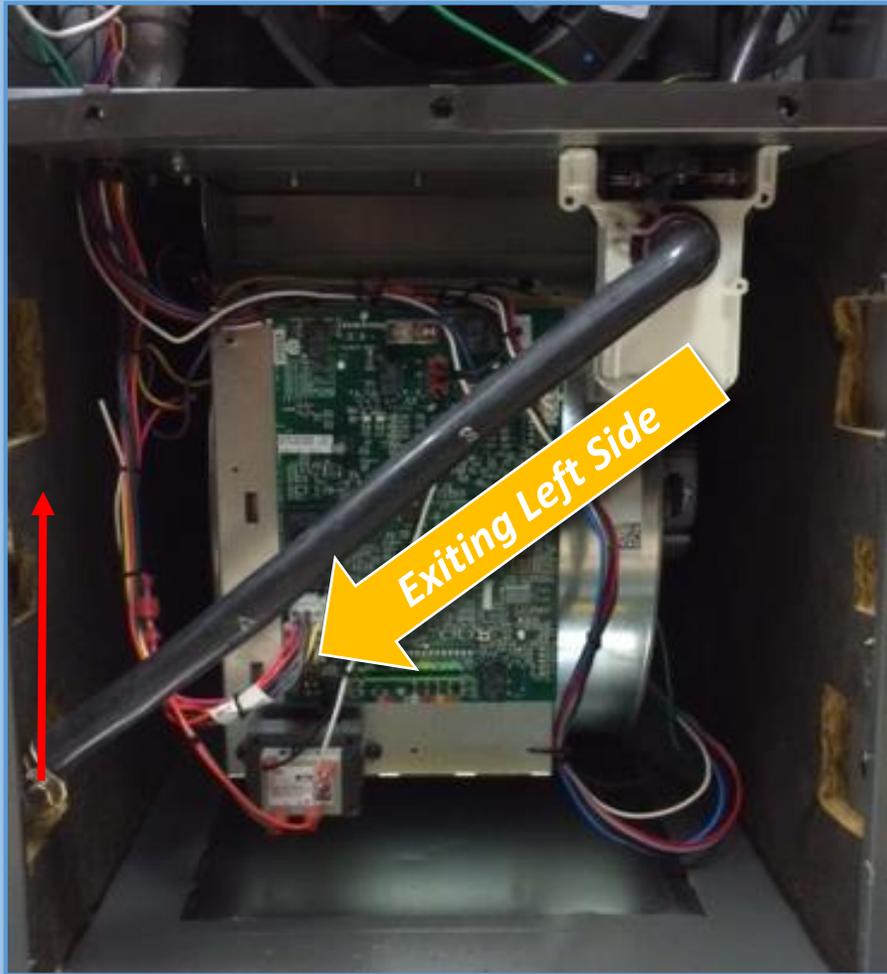
The drain pipe into the pump does not need to be inserted more than 3/4"

This is enough to keep water from spilling out onto the floor

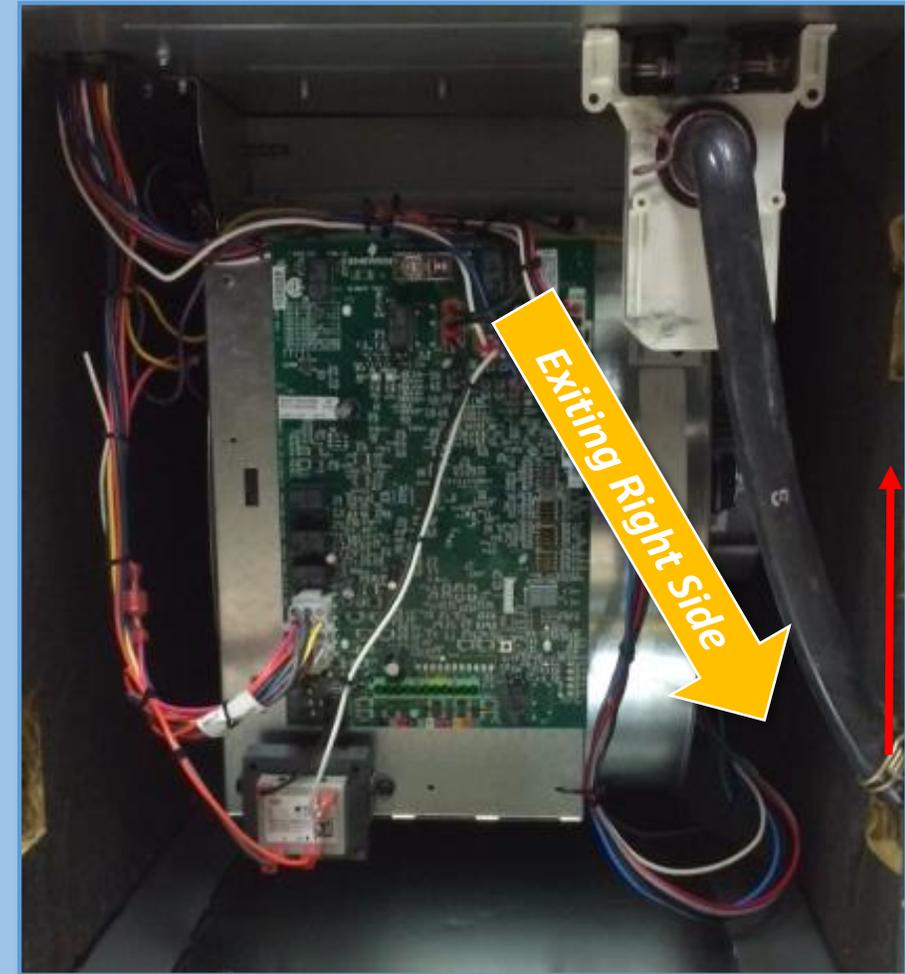
Drain Trap Installed in Vertical Upflow Furnace

- Drain Exiting Left Side

- Drain Exiting Right Side



The drain hose from the trap to the exit of the furnace can be moved up to accommodate the height of the condensate pump but enough pitch needs to be left to allow for the condensate to drain



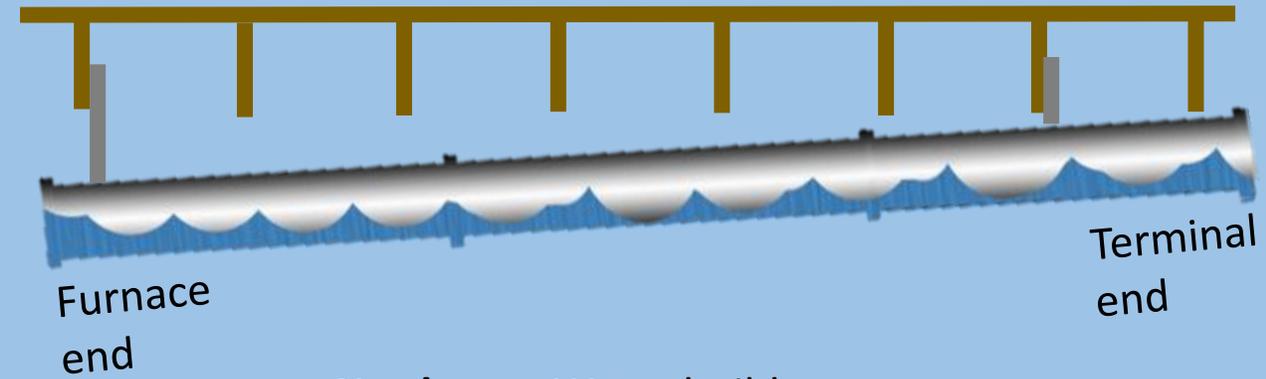
Vent Draining

The most important rule of vent draining is the vent pipe must have a $\frac{1}{4}$ " per linear foot of pipe slope back toward the Furnace

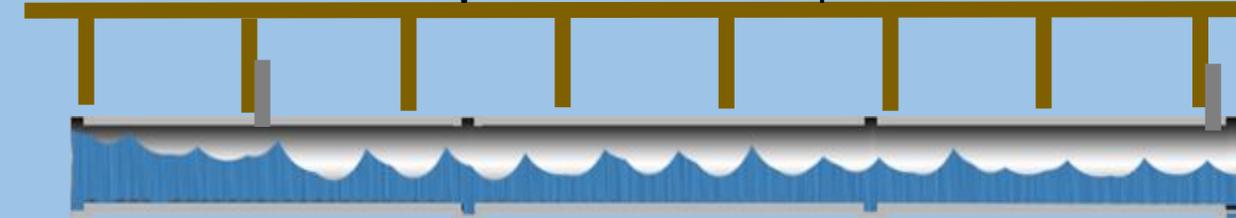
No Slope in the vent pipe will cause water to build up in the pipe. This causes a restriction in the flow of the vent gasses and will lead to pressure switch issues causing the unit to shutdown

Sagging in the vent pipe will cause water to build up in the pipe. This causes a restriction in the flow of the vent gasses and will lead to pressure switch issues causing the unit to shutdown

A 20' linear run at $\frac{1}{4}$ " of slope per linear foot of pipe would require the furnace end to be 5" lower than the terminal end



No slope = Water build up

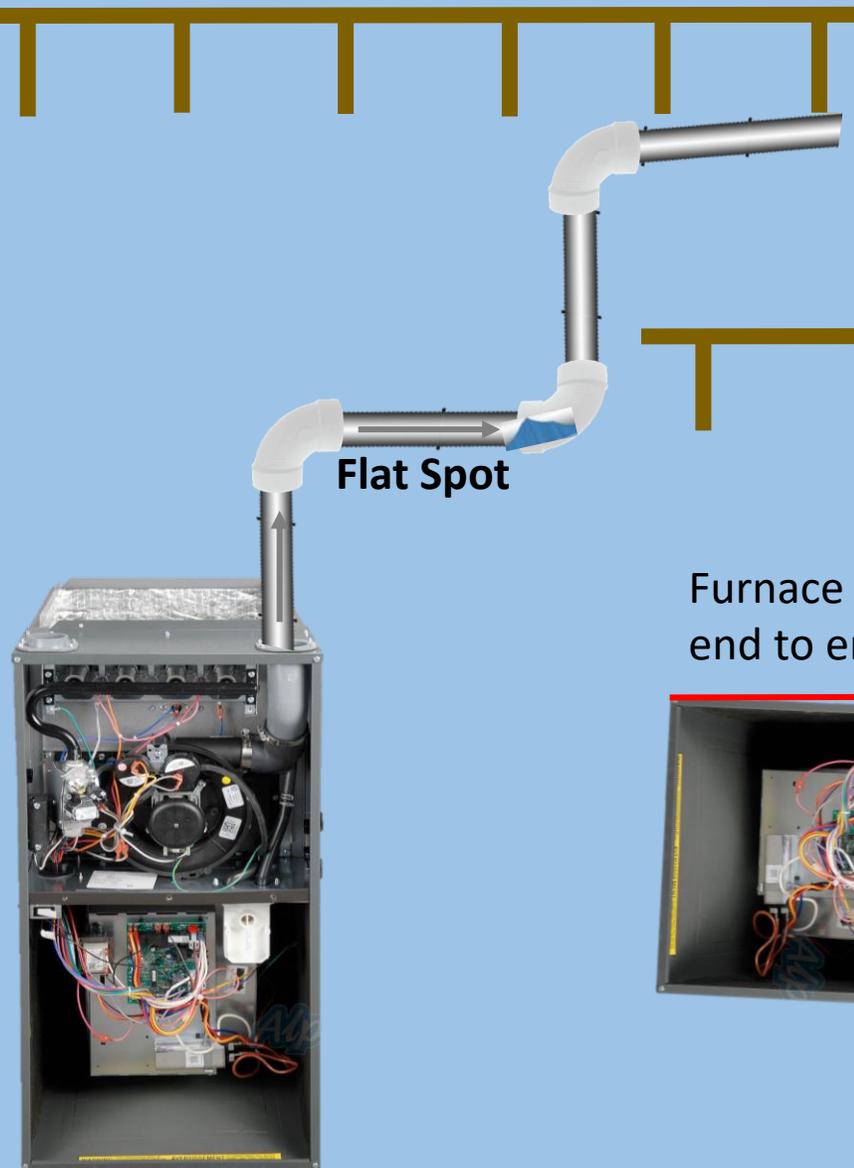


X Belly

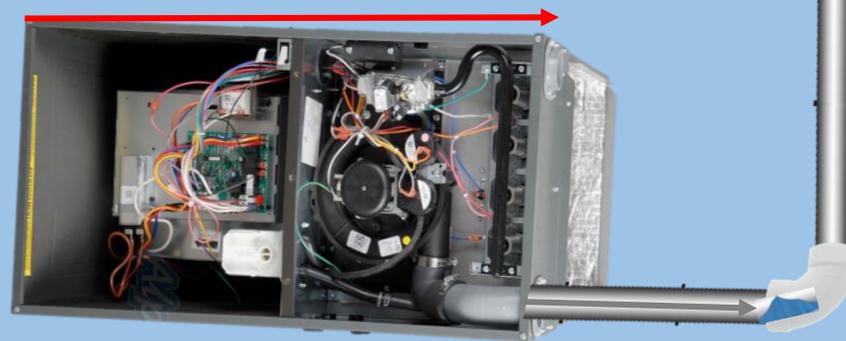


Vent Draining

There can be no flat Spots. This is a positive pressure vent. If there is a flat spot, the positive pressure will push against the water and hold it until the weight of the water is too heavy for the pressure to hold back causing the water to collapse and a momentary pressure flutter that knocks the flame out



Furnace not level from end to end



Because the furnace is pitched downward towards the vent, there is going to be issues with the furnaces running and water getting back to the drain

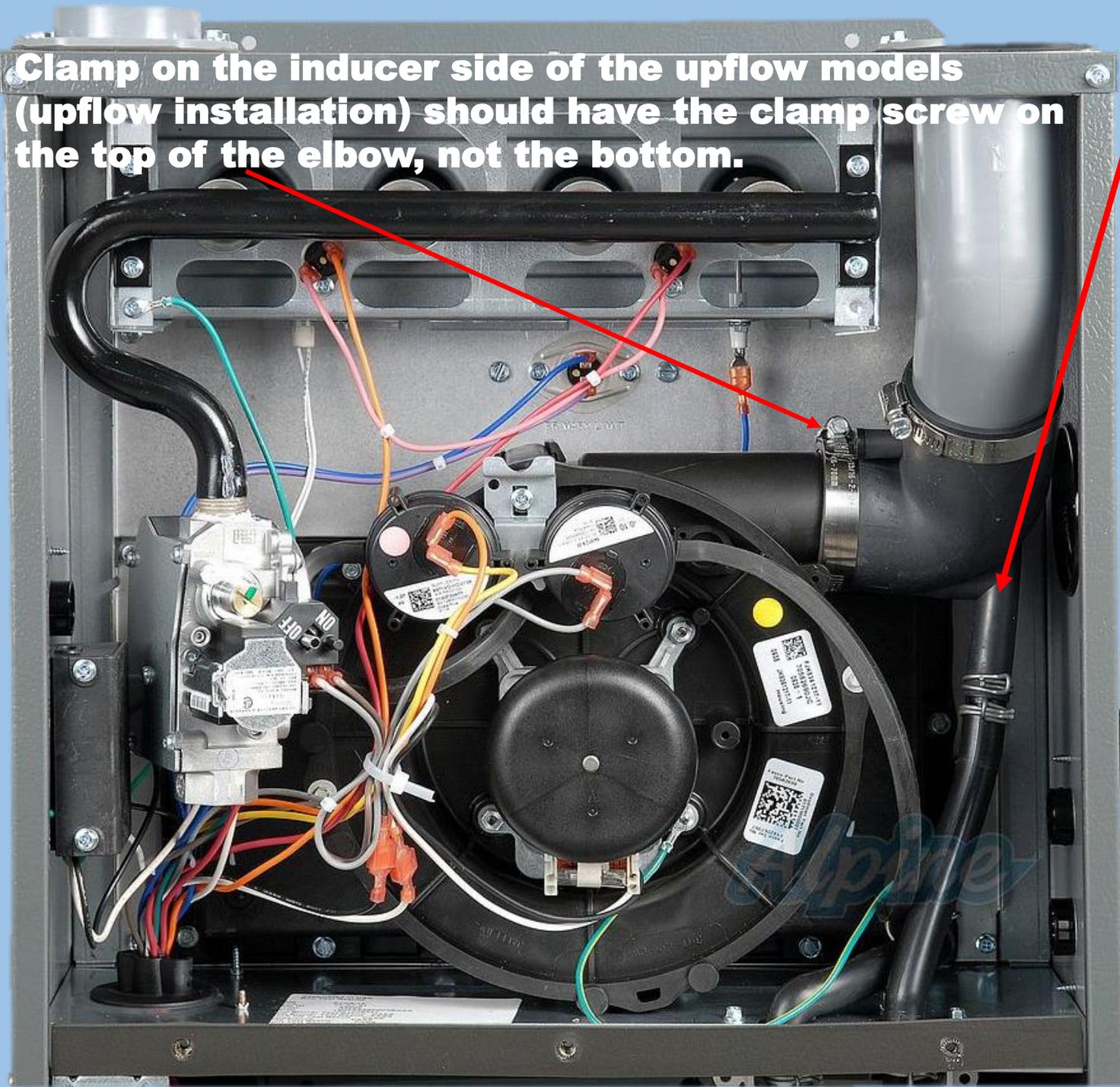
Clamp on the inducer side of the upflow models (upflow installation) should have the clamp screw on the top of the elbow, not the bottom.

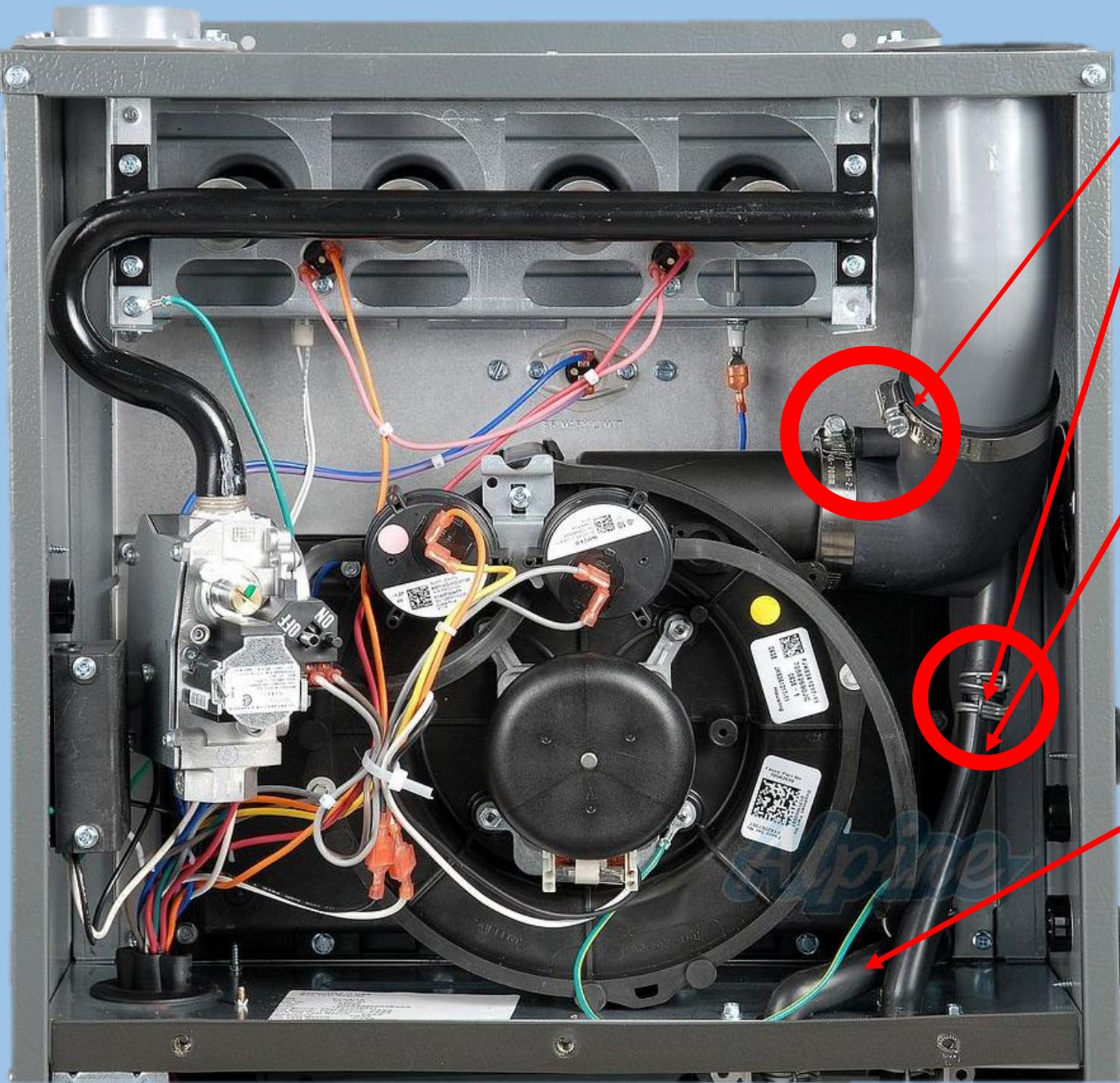
The drain port on the elbow should be lower than the bottom of the inducer outlet.

Some elbows have been factory installed too far up on the vent pipe, making the drain port higher and allowing condensate to enter the inducer.

There should be NO build up of water in the inducer motor. This is a sign that you need to lower the vent draining elbow.

Water in the inducer can cause pressure switch issues



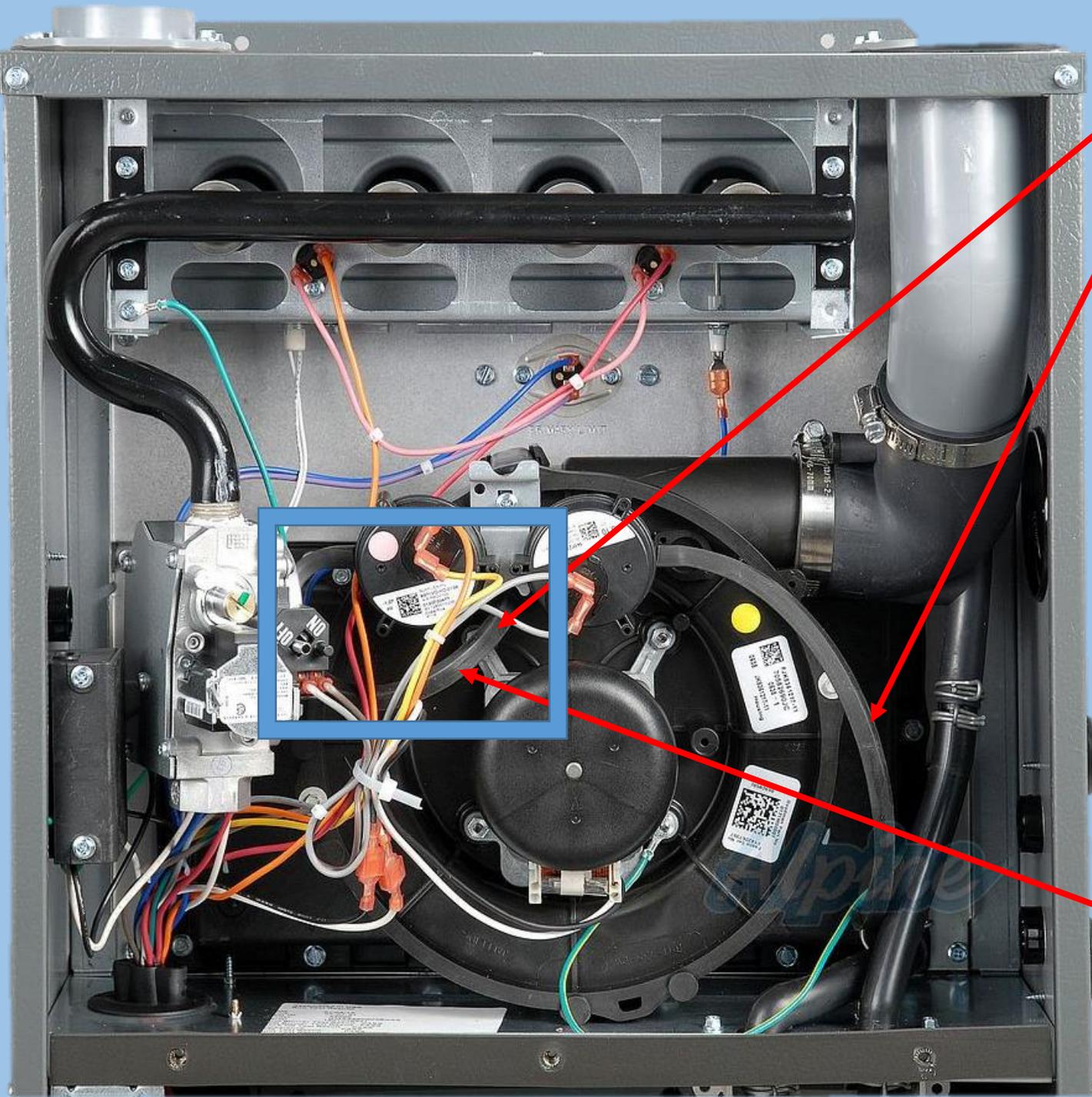


If you need to lower the drain elbow, loosen the two clamps, and disconnect the elbow drain

Use your free hand to pull down on the elbow drain port, and tighten the clamps.

You may have to cut a little bit off the drain tube before reconnecting.

Make sure this hose maintains a downward pitch from the front cover drain exit toward the trap. Sometimes the hose is a little long, causing the hose to bow up and slow the drain down



Make sure all vacuum hoses are not sagging like the one in this picture.

Notice how the front cover pressure switch hose is trimmed so that from the pressure switch to the front cover there is a continuous downward slope so even if some water vapor gets in the tube on the off cycle, when it condenses, it will drain out

Reroute and/or trim the vacuum hoses, if necessary, so there is no possibility of moisture building up in them.

This hose could be rerouted over the pressure switch wire and trimmed a little to keep the slope towards the inducer