



Tech Tip

***Ductwork Sweating???* Measure the Dew point...**

'Tis the season for sweating ductwork. It is inevitable that this time of year the ductwork begins to sweat in the attic space. Grilles begin to sweat in the home, and Technicians begin to sweat as soon as they get up in the morning. But why does it seem like it has been so much more lately than it used to be? Well the answers may surprise you.

Surfaces condense water (sweat) as they lower to, or below the dewpoint, and from my perspective; this is one of the most useful numbers that technicians in the south can measure. My weatherman gives me the dewpoint number every morning and from there I can identify how my day will probably run. When the dewpoint is in the 60's or below everyone is smiling and saying how comfortable it is, and guess what? Virtually no sweating of ducts or grilles... but when he tells me it is in the low 70's, the problems start raising their ugly heads. Heaven forbid when he tells me that it will be between 74 -80 dewpoint range, when it is so humid that ***everything*** begins to sweat. Over the past few weeks, in my city, the dewpoint has averaged about 75 degrees. The dewpoint does not change as the sensible heat goes up or down, so in a ventilated attic, whatever the dewpoint is outside, it is typically really close to what it is in the attic space. Add a swimming pool, lake, or water view to the inlet ventilation air and the moisture content increases dramatically.

OK so if it is 75 degree dewpoint in the attic and the air running through the ducts is typically 50-65 degrees then it will not take long until sweating starts to take place.

Oh yeah, "What about the insulation on the ducts? Doesn't that stop the moisture?" Well, insulation is made up of fiberglass which traps air to slow thermal transfer. If the vapor barrier on the ductwork is not watertight with mastic or an approved seal, then the moisture from the attic air flows quickly through the opening into the insulation. Once this happens this same moisture will reach the duct and condense between the duct and the vapor barrier.

"But my ducts sweat on the outside of the vapor barrier." This is because of a few things, but always because the vapor barrier is below the dewpoint in the space.

- ***Undersized ductwork equals lower temperatures in the ductwork making it easier to reach dewpoint***
- ***Thermal washing of the duct insulation because of leaking ducts that were not completely sealed.***
- ***Thermal washing because 2 stage units, longer run times equals time for the cold duct air to cool through to the vapor barrier.***
- ***R-4 or R-6 or R-8... Well... less insulation equals quicker thermal wash to the vapor barrier.***
- ***Well ventilated cool attics, many with radiant barrier sheathing, or possibly white metal roofs***
- ***Or more recently, customers that run their units on 68or less...***



It has been my experience that the cooler we get the ventilated attic space in the southern market the more often we see the equipment and ducts reach dewpoint. This is very evident in crawlspace homes with ductwork run under the home and the chain wall not well ventilated. (Too cool + Too much moisture = Sweating ductwork.

When attics were hotter, the equipment in the attic stayed hotter throughout the night and into the next morning. With the well vented attics (while better for energy efficiency) the equipment cools down to outdoor conditions during the night and when the unit cycles on, its surface temperature can easily drop to, or below the dewpoint.

While positive and negative home pressures, un-insulated can lights, unsealed ceiling boxes, will also sometimes cause grilles to sweat, the key point to take away from all of this is... If you are not measuring dewpoint in the space you are working you have no way of beginning to understand, or fix the problem.