

The furnace and the swamp cooler, aka ‘The Odd Couple’

Keep your finicky Felix happy this winter by covering all the ductwork

MILEs DysoN

Living Green

Here in Las Cruces, the mostly dry, high desert climate allows us to cool our homes with one of the least expensive, most efficient and simple systems available – evaporative cooling, affectionately known as the “swamp cooler.”

Ancient Persians arranged and moistened reeds to funnel and cool air entering their homes. Thousands of years later the concept remains the same and is both simple and effective.

Evaporative coolers can be found in a range of designs from simple four-sided aspen pad units to high-efficiency units with high tech non-water contact air exchange media. However elaborate the design, these systems rely on moving high volumes of outside air through a water saturated medium into the home and back out to the exterior.

Since the cooled air is not re-circulated in the home or the ductwork, leaks in the envelope of the home or gaps and penetrations in the ductwork are not critical to how well the system works.

So, if the evaporative cooling system is the “Oscar” of our home’s heating and cooling odd couple, the furnace is the finicky and high maintenance “Felix” sharing common living arrangements in the home’s heating and cooling air handling and duct system.

Oscar vs. Felix

Oscar the swamp cooler happily blows through life with the windows wide open, a drip and a leak here and there – it’s all T-shirts and cold beer for the summer, as long as humidity is low. As the days shorten and the nights turn cool, Felix the furnace has to go to work and he’s not going to tolerate what’s been going on while Oscar was in charge of the home’s comfort.

Our home’s forced air furnace system typically shares the same ductwork as the evaporative cooler, after that, the functional similarities end.

The furnace heats by re-circulating the air from inside the home through the heat exchanger and blowing the heated air to the distribution ducts and back to each room through ceiling or floor registers. The energy to provide the heat is derived from natural gas, propane or electricity and is expensive. To satisfy finicky Felix, some things will have to be put in order or someone will have to pay (cold, drafty nights and high utility bills). Of course, when we begin to heat our homes we need to tighten up. Weather stripping at the doors and windows should be checked for gaps and replaced if needed.

The furnace has enough work without heating the great outdoors.

As important as it is to keep the home sealed tightly, when it comes to furnace efficiency – “it’s the ductwork dummy” – Felix the furnace will nag and annoy if ductwork and return air compartments allow heated air to mix with air from outside. Since sections of the ductwork are both pressurized and depressurized to move air through the system, the amount of heated air loss to duct holes or gaps is far greater than at a leaky door or even an open window.

Ductwork openings

The first, and typically the biggest, opening in the ductwork is where the evaporative cooler connects to the distribution duct system. This opening is usually closed for the heating season by inserting a blade or “cookie sheet” cover into a slot below the cooler at the roof. The more tightly this blade fits the duct opening, the better.

Many homeowners rely on a tarp cover over the evaporative cooler to “seal” that opening to the duct system for winter furnace operation. This preserves the paint on the evaporative cooler, but that’s about it.

There must be a physical isolation barrier in the ductwork to keep heated air from escaping. This simple detail is often overlooked; I see it firsthand every week when conducting energy audits and home inspections in our town.

The return air compartment is the inlet and low-pressure portion of the duct system where air from the home is drawn in by the air handler fan to be heated and then distributed throughout the home. Most return air compartments are simple wood framed stands that serve a dual purpose – to support the mechanical equipment and provide the pathway for air to enter the heating system.

In most homes, the wood framing also serves as wall framing with large openings connecting the return air compartment to wall and attic cavities. Where this is the case, the furnace is not only heating air from the rooms of the home, but also big volumes of air drawn from outside. This makes Felix really cranky, and to prevent hearing his complaints we can make some simple changes.

Install a boxed or sealed return at the inlet to the air handler will close off the openings to the exterior and greatly improve furnace efficiency. This can be done with a section of dedicated ductwork connected directly to the return air inlet grill or by using sheetrock or similar solid surface sheeting sealed with high velocity duct mastic to close up the openings to the wall framing.

Once these large openings are located and serviced, Duct Blaster infiltration testing by a home energy auditor or heating and air conditioning technician can locate smaller but important leaks in the duct distribution system.

Felix the furnace is not a bad guy; he simply likes things to be put in proper order. If we live by Felix's tight ductwork rules, improved comfort and lower utility bills are the reward. Before we know it, our short winter season will be over and Oscar the evaporative cooler will breeze back in to efficiently laze away the summer.

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