

Inspections Identify Furnace Heat Loss

Nobody needs to be reminded about the high cost of heating fuels, especially those with struggling budgets. Identifying air leaks and heat loss from central forced air heating units is therefore an important part of the home inspection process. Certainly there can be significant issues with heat loss from the duct system in the attic or crawl space, but for now, let us focus on the furnace itself.

One of the most common heating systems utilizes a mid efficiency natural gas furnace, typically in the garage, with a system of ductwork in the crawl space that supplies heat through floor registers. The gas water heater is commonly installed adjacent to the furnace. Considering this example, think of the furnace as being divided into three compartments: The upper compartment has the blower and filter and receives the return air from inside the house through a large duct we call the return plenum. The middle compartment contains the heat exchanger which transfers heat to the return air being blown over it. The lower compartment, or supply plenum, then receives this warm air and distributes it through the ductwork.

During the inspection it is not uncommon to find substantial air leaks between the middle and lower compartment in which case warm air is being lost into the garage. Sometimes the gasket or tape used to seal the gap between the two is missing or damaged and warm air readily escapes the system. If there is an air conditioning or heat pump system installed, air leaks may be detected where the refrigerant lines and PVC condensate line penetrate the housing. A smoke pen will quickly identify these leaks as will a small amount of talcum powder blown from the hand around the suspect areas. Taking the time to ensure these areas are properly sealed can substantially reduce unnecessary heat loss from the furnace.

Gaps or openings in the upper compartment or return plenum create a different and potentially hazardous set of conditions. A very strong blower is needed to suck the air from the house back into the furnace and then distribute it through the ductwork. This means the return plenum portion of the system is under considerable negative pressure. In fact this negative pressure is so powerful that under certain circumstances it can actually depressurize the space where the furnace is installed. In a worst case scenario, this depressurization can impede appliance venting and draw the byproducts of combustion back into the living space. In our example, even the venting of the gas water heater could be adversely affected. This is why furnaces have a blower door interlock, a switch which prevents operation of the furnace if the blower door is open. Again, using the smoke pen or talcum powder trick around the return plenum and filter door will identify air leaks in the system by sucking the smoke or talc into the furnace.

It is very common during inspections to find furnaces with no record of regular or recent servicing. Often there are also air leaks, heat losses or other issues which the homeowner is unaware of. Clearly, the small cost of regular professional furnace servicing is money well spent.

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