

6. Ventilation and indoor air quality – Fresh air – no longer an accident

Accidental leakage vs. controlled ventilation

Not too long ago, homes were built with little attention to air sealing – accidental air leakage allowed entrance of fresh air and exiting of stale air. The art of homebuilding and the technologies available today are producing homes that are much tighter than in the past. What this means is that ventilation cannot be ignored and left to chance in today's new homes.

Ventilation basics for bathrooms and kitchen

There are two important criteria to consider when selecting a ventilation fan: 1) how many cubic feet per minute (cfm) can the fan push? 2) how noisy (rated in "sones") is the fan? For quiet operation, look for fans with a maximum 1.5 sone rating.

Stoves with built-in fans are inefficient at removing moisture and too efficient at removing conditioned air. Since homes are now being built much tighter, it is important that vent fans not be oversized. Being a little undersized is better than oversized and reduces the opportunity for dangerous back drafting.

A slightly outdated rule-of-thumb for sizing fans is to estimate the cfm by adding 10 percent to the floor area of the space. For instance, if a bathroom is 80 square feet, $80 + 8$ (10% of 80) = 88 cfm. Since fans do not come in all available cfm's, select the next largest available size. The Arkansas Mechanical Code (503.3.2) says that the exhaust air can be a minimum of 1 cu ft. per minute per sq. ft of floor area."

Cost vs. benefit of good ventilation

Why should a builder make the extra effort to build it tight, and then have to spend more money to ventilate it right? Many builders now understand that a few hundred dollars invested in mechanical ventilation can pay a large return in the durability of the building, the health of its occupants, and reduced callbacks.

An option that is acceptable for a climate with less humidity is to use just the kitchen and exhaust fans for ventilation. The problem with this option in our climate is that in the summer, the humid make-up air is coming through cracks and openings wherever it can.

A preferable approach is to put the house under a slight positive pressure by ducting the fresh air directly into the return side of the furnace and installing a control timer. The advantage of a positive pressure is that any leakage will be pushed out of the house. The problem with this option is the same: an introduction of humid air in the summertime.



Note: re-circulating range hoods do not remove kitchen moisture and odors; these devices are essentially just grease traps. A hood over the stove with a good exhaust vent will remove moisture and cooking odors and keep them from contaminating the home.

The most comprehensive ventilation strategy is to install a stand-alone, air filtration and dehumidification system. This is not inexpensive; however, it is the best solution to indoor air quality and moisture removal for our climate.

Filtration and ventilation

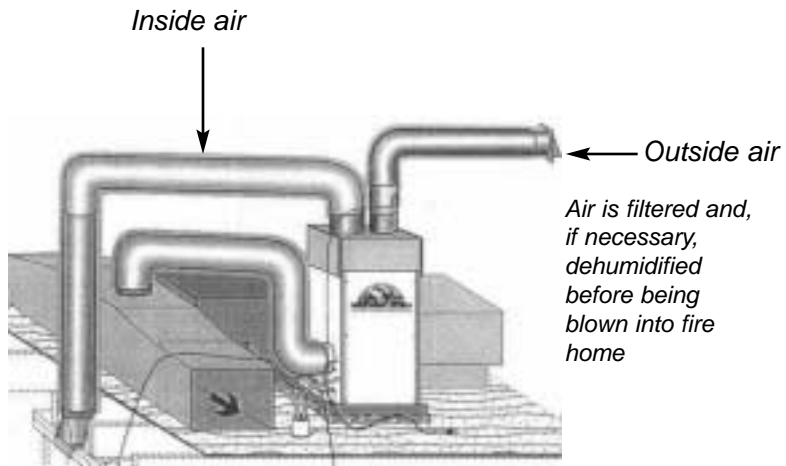
All homes have some level of pollutants in them. As homes become more airtight with improved building techniques, attention to ventilation becomes more important. While most houses in Arkansas currently are not built tightly enough to need supplemental ventilation, controlled mechanical ventilation is a good way to improve air quality. Such systems not only offer the homeowner control of the air they breathe but also the opportunity to dehumidify, filter and clean the air inside the home and the air that is introduced from the outside.

Unvented gas fireplaces – a note of caution

The by-product of gas combustion is a tremendous amount of water vapor that, in a fairly tight house, can quickly accumulate and condense on windows and other cool surfaces. The homeowner must open a window, usually in the middle of winter, to provide fresh air for combustion and breathing, and to remove moisture and other gasses. It is important to stress that homeowners read the instructions that come with a non-vented combustion fireplace to ensure that they carefully and appropriately operate it. The American Gas Association says, "If a home is below 0.35 air exchanges per hour (extremely tight construction), additional mechanical ventilation should be added before installing a vent-free gas heating appliance." This recent survey indicates that about half of Arkansas' new homes are in this "extremely tight construction" category.

In a very tight home, a sealed combustion fireplace, although more expensive, would be the best choice. **See page 37.**

Ventilation and indoor air quality



An air filtration, ventilation and dehumidification system



An unvented fireplace