

# House Ventilation

Decide Which Ventilation Strategy is Right for Your Home



## SKILL SET

Be sure you have the experience needed for these maintenance tasks. For electrical work, if you are in doubt, hire a contractor.

## SAFETY

These upgrade tasks may require working in tight clearances and under task lighting. Exercise common sense when working on a ladder.

## TOOLS

Utility knife, jigsaw for cutting roof decking, drywall saw/zip saw for cutting drywall, electrical pliers, drill and screw driver if installing fan

## MATERIALS

Caulk, spray foam sealant, roofing sealant, vent penetration hood with flashing

## BENEFIT

Improved comfort and indoor air quality

### PRIORITY LEVEL

LOW MED **HIGH**

### SKILL LEVEL

**DIY** PRO

## Healthy Homes Need Ventilation

Everyone wants a healthy home that is comfortable and affordable to heat and cool. To save energy and increase indoor comfort it is important to tighten a home and reduce unwanted air leaks that can bring in outdoor pollutants, provide an entryway for insects and rodents and drive up energy bills.

However, a healthy home needs “controlled” ventilation, meaning pollutants removed from areas of high concentration and fresh air, in the right amount and at the right time, delivered throughout occupied areas of the home to maintain health and comfort and not create high energy bills.

Controlled ventilation can minimize exposure to unhealthy pollutants such as airborne chemicals and particles, cigarette smoke, combustion gases, excess moisture and radon.

### To help ensure healthy indoor air:

- Avoid bringing sources of pollutants into the home; store toxic chemicals like pesticides and certain cleaning liquids outside the home in the garage or storage shed.
- Make sure pollutant-emitting materials are sealed tightly and not stored near people or heating and cooling equipment that circulates air in the home.
- Capture indoor pollutants with a filter or air cleaner.
- Dilute pollutants with fresh outdoor air via ventilation.

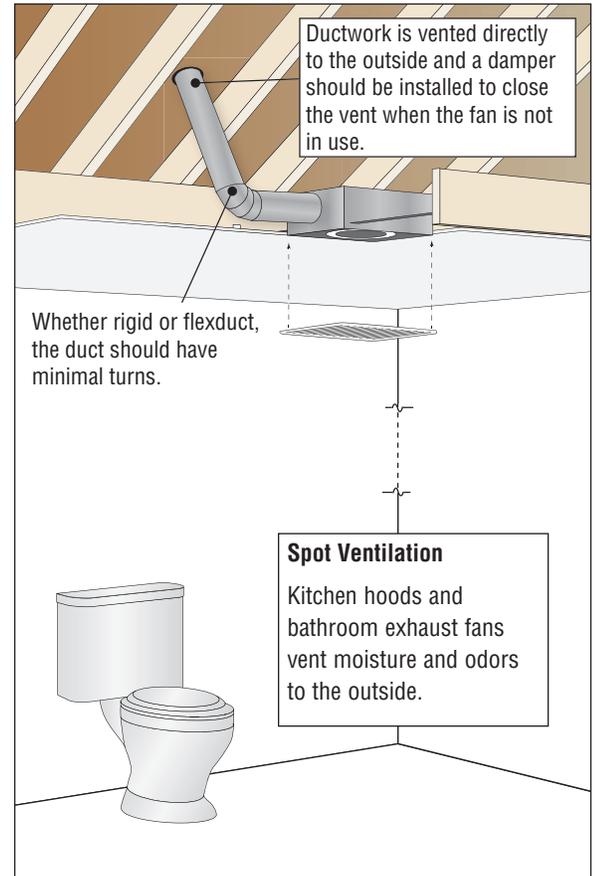
## How Much Ventilation?

The amount of ventilation recommended depends on many factors including the strength and type of pollutants, size of home, number of occupants, age and health of occupants and local climate.

All homes need ventilation and it is incorrect to assume that any architectural style, construction type or age of home does not benefit from controlled ventilation. As a general rule all homes need exhaust fans for kitchens and baths and many will need additional ventilation for the rest of the home.

## Local Exhaust

**Local (spot) ventilation** usually means removing pollutants (such as moisture and odors) at or near the source. The two most common sources are the kitchen and bathrooms. All bathrooms (especially ones with showers or bathtubs) and kitchens should have local exhaust fans that are ducted to the outdoors, not into a crawlspace or attic. Exhaust fans



should include dampers that close when the fans are not in use. Always select ENERGY STAR labeled fans to ensure quiet and efficient performance.

### Exhaust fan to do list:

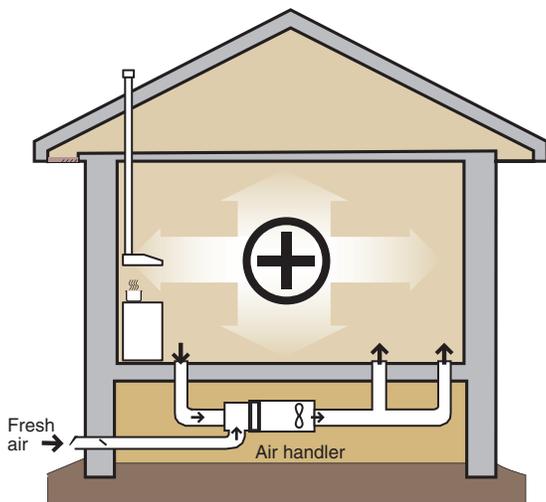
- Visually inspect the ducting to ensure adequate connections and that it terminates to the outside
- Remove the grill, inspect the housing (clean/vacuum if necessary) and verify that the damper is opening and closing properly during operation
- With the grill installed, test that the fan can easily pull and hold a single piece of toilet tissue to the grill
- Consider replacing an on/off switch control with a preset timer or humidity sensor control
- Upgrade older, noisy and inefficient fans with quiet, efficient ENERGY STAR products

## Whole House Ventilation

**Whole house ventilation** provides fresh air throughout the house and can run continuously or intermittently at regular time intervals.

Techniques for whole house ventilation generally fall into three categories: supply, exhaust and balanced.

**Supply only** - one of the most popular and reasonably inexpensive strategies to introduce fresh air into a home is by adding an outside air duct to the return side of the air handler unit (AHU) blower for the central heating and cooling system. Since the return is under negative pressure when the AHU blower is operating, fresh air from the outside will be pulled in and the house will experience a slight positive pressure. This is particularly desirable because the air is drawn from a known (fresh) source and the slight positive pressure helps combustion appliances and fireplaces vent better. However, this strategy is not recommended for extreme cold climates as the outdoor air can create comfort and equipment problems.



**Fresh air intake vent** - a small outside air duct connected to the return creates desirable positive pressure and can be controlled to operate regularly. If the house pressure is slightly positive compared to outdoors, pollutants such as pollen will not be pulled inside.

One of the main components of a supply only ventilation system is an air intake, such as a wall cap with bird screen or a ducted inlet with a filter grill from a covered porch. It is generally better to pull in fresh air from higher up but low intakes can be placed carefully and still work successfully. Either a dedicated filter or the main filter at the AHU blower must be in place.

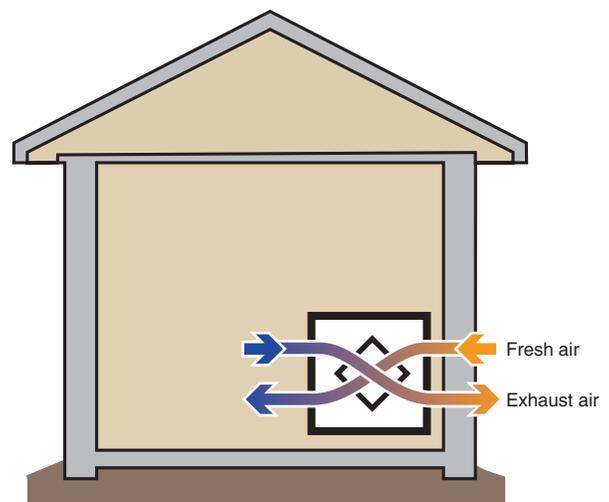
A timer controller operates the AHU blower and a mechanical damper to adjust the amount of time that the fresh air duct is open to the outside. This timer will ensure that a minimum amount of fresh air is delivered to the home even in mild weather. It will also prevent over ventilation from occurring due to long AHU blower run times during extreme weather.

**Exhaust** - whole house exhaust systems bring in a set volume of fresh outdoor air at specified times. Exhaust systems typically have the lowest first cost and are usually inexpensive to operate. They commonly have a dedicated exhaust fan that draws air from the main part of the home or an upgraded bathroom fan. Quality exhaust fans are quiet and often have both automatic and occupant controls.

The primary concern with exhaust-only systems is that while air is being pulled out of the house at a known location, the air coming in could come from any number of undesirable places such as an attic, crawlspace or garage. There is also no chance for energy recovery on the outgoing airstream. Finally, due to concerns with having the home under constant negative pressure, an exhaust only strategy is not recommended for homes in a humid climate or for homes with atmospherically vented combustion appliances (e.g., a standard gas water heater or fireplace) connected to the living space.

**Balanced** - a balanced ventilation system works by pulling in the same amount of outside air that is exhausted and can be used effectively in any climate. Balanced ventilation offers the opportunity for heat or energy recovery, basically using the energy of the stale, exhausted air stream to pre-condition the incoming fresh air stream. In cold climates, a heat recovery ventilator (HRV) is used to pre-condition the incoming air via an air-to-air heat exchanger. In humid climates, a similar concept is employed with an energy recovery ventilator (ERV), which can transfer both heat and moisture.

ERVs and HRVs cost more up front than exhaust or supply systems but usually recoup some of that cost due to their energy savings. They also filter the incoming air which can reduce dust, pollen and other pollutants.



**Balanced system** - whether an ERV or a HRV, the concept is the same for a balanced whole house system. Incoming fresh air is filtered and tempered with outgoing exhaust air. Location of the device is usually dependent on the AHU blower and ductwork for the house.