

Ventilation for Your Home

Why Should I Ventilate My Home?

Indoor ventilation is essential to exhaust pollutants, moisture, and odors from a building. In many cases, an older home's natural air leaks provide sufficient ventilation, but newer construction and weatherized older homes may require mechanical ventilation. A tight and well-insulated house is crucial for comfort and energy efficiency, but tightening the home may cause other issues, such as excess indoor humidity. Following the rule of thumb "build tight and ventilate right", a house can be both energy efficient and appropriately ventilated.

How Can I Reduce Window Condensation Issues?

During upper Midwest winters, you can expect some window condensation. In cold weather, some house air escapes past single-pane prime windows around framing and through required openings and may leave moisture on the inside of the storm windows. This effect is more pronounced when the outside temperature is less than 20°F. Thermal (double or triple) pane windows may also have condensation issues in colder weather or if there is excess indoor humidity. Operate your exhaust fan continuously in below freezing weather to limit window condensation.

It is often useful to know your home's humidity levels. A hygrometer to measure indoor humidity levels costs around \$40. In the winter, it is recommended that you lower indoor humidity levels as outside air temperatures drop. For example, at outside temperatures of 20°F or higher, interior humidity levels should stay below 40% to maintain reasonable condensation levels. In outside temperatures below zero, interior humidity levels should stay below 25%. Warming the glass will also help to limit interior window condensation. Leave window coverings open several inches at the bottom or add plastic film to interior windows. In very cold weather you may also need to raise the room temperature to help reduce window condensation.

What Kind of Ventilation System Should I Install?

We recommend installing an Energy Star qualified exhaust fan that is rated for continuous operation. Many brands of very quiet exhaust fans are available, they use very little energy (about 2% of annual energy costs for most homes), and they are designed to run full time in order to provide adequate home ventilation. A noisy old bath fan is generally not rated for continuous operation and is a great candidate for replacement. Often, your new Energy Star fan can use the same wiring.

We recommend using either a manual or automatic two-speed switch (such as an occupancy sensor) that toggles the fan between the high and low flow rates only; the switch shouldn't turn the fan off. The low speed should be set to at least 25-35 cubic feet per minute (cfm) to provide continuous ventilation. Use the high flow setting when you are producing higher amounts of moisture, such as when you shower. This kind of ventilation system is effective and simple to operate and maintain.

Some manufacturers offer Energy Star qualified exhaust fans with built in two-speed fan controls. For single-speed fans, you may add a switch which allows the fan to function at two speeds. If adding a two-speed control switch to a single-speed fan, be sure to first verify with the manufacturer that the components are compatible and that the addition will not void any warranties.

Model options should be discussed with your installer. Some insulation contractors will install exhaust fans, or you may need to hire a licensed electrician. Exhaust fan installation guidelines are listed on the reverse side of this document.

Exhaust Fan Installation Guidelines

Basic Specifications:

- A. Exhaust fan should be Energy Star qualified.
- B. Exhaust fan should be rated for continuous operation, and equipped with either a manual or automatic switch (such as a motion sensor) to toggle between a low and full rated flow.
- C. Exhaust fans with a full flow rate of 110 cfm (cubic feet per minute) or less should have a sound rating less than or equal to 1.0 sone, and exhaust fans with a full flow rate of greater than 110 cfm should have a sound rating less than or equal to 1.5 sones.

Installation:

- A. Exhaust fans should be installed per manufactures instructions and applicable State and local mechanical codes.
- B. Fan housing should be sealed at penetration through ceiling or wall.
- C. Gaps and holes in fan housing shall be sealed.
- D. Duct materials:
 - a. Rigid, smooth metal 30-gauge wall thickness or thicker should be used, or
 - b. PVC schedule 30 or thicker should be used, or
 - c. Flexible duct materials UL 181 listed or Air Diffusion Council approved should be used.
 - d. Tapered reducers should be used when duct or fitting diameters differ.
- E. If more than two feet of flexible duct is used, duct size should be increased by 50% of exhaust outlet while retaining a straight, fully supported run.
 - a. Horizontal runs should be supported at intervals of 4' (four feet) or less.
 - b. Exhaust outlet duct should extend straight for minimum two feet before elbows or bends are added to duct run.
- F. In addition to mechanical fasteners, seal all duct connections and elbow gores with UL 181B or 181B-M listed material.
 - a. Approved sealants include foil backed butyl tape, such as Hard-Cast Foil Grip 1402, or burnished UL 181 listed metal tapes and water based mastic, such as RCD#6.
 - b. No cloth tapes should be used.
- G. Ducts installed outside the thermal envelope should be insulated to a minimum of R-8 and have exterior vapor barrier sleeve sealed at both ends.
- H. Ducts should be directly connected to the exterior termination fitting collar.
 - a. Termination fitting located at the gable end or wall is recommended.
 - b. When roof termination fitting is required, select a location to minimize ice dam potential.
- I. Contractor should set continuous low flow rate to minimum 25 - 35 cfm, if fan so equipped.
- J. Contractor should confirm exhaust fan air flow rates.
- K. Contractor should label exhaust control switch cover plate "Ventilation Fan" and provide Property Owner with the manufacture's written product information, operating instructions and product warranty against defects in workmanship and materials under normal use for minimum period of one year.