



September 2012

What's an HRV and how does it work?

Heat Recovery Ventilation (HRV) systems are becoming increasingly common in cold climate construction and are almost indispensable in today's super-insulated, airtight homes. As older homes are receiving energy retrofits, and becoming tighter and more insulated, they are facing the same indoor air quality issues you find in new construction. HRVs improve the indoor air quality of your home and save more energy than other types of ventilation. This article provides an overview of the basic purpose and advantages of HRVs.

The main job of the HRV is to supply fresh outdoor air to the house while expelling stale indoor air—which can contain things like moisture, animal dander and gases from combustion appliances and carpets. This is especially important in a home that is too tight to rely on passive air exchange. At the heart of the HRV is a heat exchanger (often called a “core”) where exhaust air flows next to, but separate from, supply air. Here the cold incoming air is warmed by the heated outgoing air, recovering heat that would otherwise be lost. Most HRVs recover between 70-90 percent of the heat, depending on the unit and controls, making it much more efficient in a cold climate than a simple exhaust fan that blows warm air directly outside. One of the newest and most advanced models is capable of recovering more than 90 percent of the heat from exhaust air.

The ducting of an HRV system typically supplies fresh air to bedrooms and living areas while exhausting humid air from bathrooms, kitchens, laundry rooms and crawlspaces. The HRV does not eliminate the need for a cooking fan, so a range hood should still be the main outlet for grease and smoke above the cook stove.

The HRV is designed to be balanced, meaning it takes in as much air as it exhausts, maintaining close to neutral pressure inside the home. It should not create a negative pressure in the home, like an unregulated exhaust fan might, which can cause appliances to back draft (suck in air from an exhaust flue and expose you to dangerous gases). It's also important to remember that HRVs are not meant to supply air to combustion appliances.

Efficient residential units use about as much power as a 60-watt light bulb when running, and are getting more and more efficient. As with any appliance, an HRV requires some maintenance, such as checking the built-in filters every fall to see if they need to be cleaned or replaced.

In addition to providing reliable ventilation in a home, HRV systems can serve several other roles. You can install an in-line filter system on the warm-side supply air port that will filter particles and odors from the incoming air. For example, in the winter this can help keep particulate pollution (from wood-burning and other sources) out of your home.

With the right controls, an HRV can also work in recirculation mode, which distributes heat to hard-to-reach areas in the house (a big help for occupants using a woodstove). Although be aware that recirculation reduces overall fresh air exchange and can redistribute odors from unwanted areas in the house. If you own an older unit, a control upgrade may be a beneficial and cost-effective option.

While it may seem expensive up front, you should look at an HRV system as an investment in a healthy home and peace of mind. In this climate, indoor moisture can cause problems not just for the structure, potentially condensing in the walls and leading to mold and rot, but also for occupant health. An HRV will protect the occupants as well as the structure by removing excess moisture before it has a harmful effect.

If you're thinking about purchasing a system, make sure you learn about the specifics and find an installer who is willing to educate you and stand behind their work.

Ask a Builder articles promote home awareness for the Cold Climate Housing Research Center. If you have a question, contact CCHRC at info@cchrc.org or 907-457-3454.