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ENERGY FOCUS

An HRV System Overview
By Ilya Benesch, Building Educator at CCHRC

Heat Recovery Ventilation (HRV) systems are a relative newcomer to the cold climate construction scene, yet have become almost indispensible in today's super-insulated, air tight homes. They are also becoming an increasingly common element in the current weatherization and insulation retrofitting trend. As older homes are undergoing energy facelifts, and becoming tighter and better insulated, they are also facing the same indoor air quality challenges one would see in new construction. In this article I am hoping to provide a basic understanding of how HRV's work, their applications, and their advantages.

The HRV is principally designed to supply a regulated exchange of fresh air to the house, while simultaneously expelling stale indoor air. This is of particular importance in a home that is too tight to do so on its own, through passive means. At the core of the HRV unit is a heat exchanger where the airways exhausting the warm, moisture laden indoor air, flow next to the air passages bringing in outside air. At this junction, the cooler incoming air is warmed by the outgoing exhaust air, recovering a substantial amount of heat that would otherwise simply be lost. Typical heat recovery percentages can range from 70 to over 90 percent, depending on the unit and the controls. This is where the HRV shines in comparison to a simple exhaust fan that blows warm air directly outside.

A typical HRV system is designed such that its ducts supply fresh air to bedrooms and living areas while exhausting stale, humid air from bathrooms, kitchens, laundry rooms, and crawlspaces. The HRV should not be substituted in place of a cooking fan, so a range hood should still remain the primary vehicle to remove grease and smoke from above the cook stove. The HRV is designed to be balanced so that it takes in as much air as it exhausts, maintaining close to neutral pressure. Consequently, it is important to note that it is not meant to be a means of supplying air to combustion appliances. Because the system is neutral, it does not present potential back drafting hazards such as one might find in conventional unregulated exhaust fans, which can possibly create excessive negative pressures. Most units run efficiently, using about as much power as one 60 watt bulb when operating, and the industry is constantly improving energy use and performance. As with any appliance, the HRV requires some minor maintenance. Every fall would be a good time to check the built in filters and clean or replace them as necessary.

In addition to regulating air flow in a home, HRV systems can also perform several other important functions. After talking with Rich Musick and Bill Reynolds at Solutions to Healthy Breathing, I

learned that it is now possible to install an in-line filter system directly after the inbound fresh air leaves the HRV unit. This allows the home owner to filter the incoming air for particulates and odors. One application in this regard might present itself this winter to those people who may find themselves in neighborhoods with poor air quality due to excessive wood or coal smoke. The potential for pollution levels to increase in Fairbanks this winter is very real, and people with asthma or other breathing issues could benefit from this option.

One other feature worth mentioning is that with the right controls, an HRV can be made to operate in a recirculation mode. A humidity sensor in the unit insures that it meets the house's air exchange needs, after that it can be programmed to default into recirculation. This would be an excellent feature for people who are using a woodstove as a major source of heat and need a means to distribute that heat to hard to reach areas in the house.

Up front an HRV system may seem like a significant expense, but it is also important to look at it as an investment. By improving indoor air quality, the HRV can help to insure peace of mind by providing a healthy living environment year after year. It also helps contribute to the longevity of the structure by removing moisture before it has the opportunity to do real damage. Keep in mind that in this climate, indoor moisture problems are a big concern not only to the house, but also the occupants if mold is allowed to proliferate. If you own an older unit, a control upgrade may be an option, and prove quite cost-effective and beneficial. If you are thinking about purchasing a system, as always, it pays to learn about specifics, and find an installer who is willing to educate and stand behind their product.

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