

Residential New Construction Ventilation Reference

Requirements

A heat recovery ventilator (HRV) or energy recovery ventilator (ERV) is a system, not a “plug-and-play” appliance. In addition to choosing the unit carefully to maximize comfort and efficiency, distribution should be designed and installed correctly, to help prevent callbacks due to problems that can’t be fixed after installation.

The following requirements must be met in order for projects to qualify for Efficiency Vermont Residential New Construction certification and incentives:

- HRV/ERV unit meets the following requirements (see qualified products list):

Item	Why?
SRE of 75% or higher at 32°F (65% or higher for an ERV) at HVI-rated flow rate	Maximizes temperature of air delivered to room for better comfort (SRE = sensible recovery efficiency)
EC (electronically communicated) motor (ECM)	Efficient motor operation at all speeds, avoids overventilation by enabling low speed operation
Cold climate-tested	Designed to operate during Vermont winters

- Total system measured capacity meets Vermont RBES or ASHRAE 62.2-2013¹
Efficiency Vermont will verify flow rates at final inspection
- Bathrooms meet Vermont RBES spot ventilation requirements²
- HRV/ERV and all ductwork is installed within conditioned space, and the HRV/ERV is installed in a location that allows for easy filter maintenance.
- At a minimum, fresh air is delivered to main living space and each bedroom.
- Location of outside intake and exhaust terminations meets manufacturer guidelines.
- Install a condensate drain if the HRV/ERV requires it
- If the HRV/ERV uses heating/cooling ductwork, interlock it with the heating/cooling air handler
- Provide homeowner with HRV/ERV manual and an explanation of why the system is there, how it works, and maintenance requirements. Efficiency Vermont can provide you with general guidance for homeowners.

Note: The main difference between an HRV and an ERV is that an HRV transfers sensible heat (i.e. temperature) from exhaust air to incoming air, while ERVs transfer both sensible heat and latent heat (i.e. temperature plus the energy trapped in the air’s moisture). Certain manufacturers, building consultants, and installers have strong opinions on which type of system is best for cold climates, but there is no universally accepted solution for homes in Vermont. Some units (i.e. Zehnder) have the capability to swap an HRV and ERV core if you later decide that you’d like the other type of system.

¹A useful tool for calculating required mechanical ventilation rate is available at <http://www.residentialenergydynamics.com/REDCalcFree/Tools/ASHRAE6222013.aspx>.

²These may be met by the HRV/ERV providing at least 20 cfm of continuous exhaust.

Additional Information

The list below represents best practices but not requirements:

- Good targets for delivered ventilation flows (at low speed) are as follows:
 - Living room – 20-30 cfm supply
 - Bedrooms – 15-20 cfm supply
 - Kitchen – 30 cfm exhaust (a grease filter may be required)
 - Bathrooms – 20 cfm exhaust
- Design ducts using a guideline such as ACCA Manual D – this helps ensure that proper flow rates are achieved in the various locations served by the system.
 - Try to keep duct runs short and straight
 - Try to use smooth round ducts
 - Seal joints
 - Supply air should not be located near a room entry door; if there is a return in the same room, make it opposite the supply

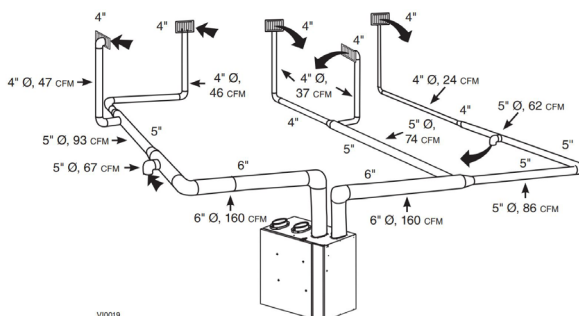


Figure 1. Example of well-designed ductwork (Image from Venmar X24/X30 Installation Manual)

- Place a balancing damper in trunk and/or branch lines or use adjustable diffusers for tuning flows.
- Commission the system, including testing and balancing the flows.
- Outside intake and exhaust terminations are minimum 10' apart, away from sources of pollution (e.g. laundry or boiler/furnace vent), and above expected snow depth.
- Ventilation flows are typically much lower than what's delivered through furnace ducts, so using them can result in poor control over ventilation air flows. Use dedicated ventilation ductwork as shown in Figure 1, rather than tying into heating or cooling ducts. When that's not possible, at least try to provide dedicated ductwork for the exhaust side of the ventilation system. If using the heating/cooling ducts, follow manufacturer recommendations and interlock the HRV/ERV with the heating/cooling air handler.

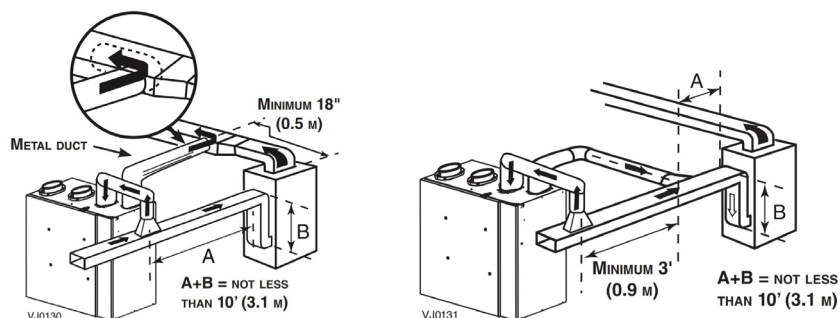


Figure 2. Examples of integration strategies with furnace ductwork (Image from Venmar X24/X30 Installation Manual)