Achieving reliable ventilation effectiveness in relatively tight homes requires a balanced system. Heat recovery ventilators, HRVs, are the optimal home ventilation system for the Northwest. Energy recovery ventilators, ERVs, are better suited for humid climates due to complexity and added operational costs, we also don’t recommend integrated HRV/ERV systems. Read below for tips and recommendations to make the most of your HRV installation—unless properly designed, installed and operated, an HRV may not save more energy than an exhaust fan.

**HRV SYSTEM BEST PRACTICES FOR THE NORTHWEST**

**Planning**

**SYSTEM DESIGN CONSIDERATIONS**

If located in the same room, supply air should be delivered on the opposite side of the room from the entry door or exhaust air. System filters and core must be easily accessible for maintenance. Install exhausts in bathrooms, supplies in bedrooms, and both in the main living area.

HRV supply and exhaust air vents should be >10 ft. from house entry vents as a rule. Ensure proper condensate drainage. Consider the usefulness of gravity for drainage purposes. Create an air exchange in conditioned space (but never in an attic or crawlspace).

**Are you planning to have continuous ventilation?**

Ensure HRV is capable of delivering airflow at the continuous rate (recommended at a medium-range speed setting). For a balanced design, the CFM requirements for an HRV system are as follows:

For 20 min. ventilation and 40 min. of recirculation, use:

- HRVs: 15 x 7.5 x 1.5
- ERVs: 1 x 7.5 x 1.5

Minimum fan speed for intermittent ventilation is 20 min. per hour.

**Energy considerations**

For efficiency and comfort, the system must have high SRE, high ASE and high efficacy. The fan efficacy indicates the amount of air that can be moved per unit of energy used. Efficacy lower than 1.25 CFM/watt may still transfer heat from airstreams and ensure that each full bathroom is receiving 50 CFM continuous ventilation. When using a packaged HRV and duct system, use the manufacturer’s guidelines for fan size along with an HRV and standard ducts, size ducts to table below:

<table>
<thead>
<tr>
<th>Max. CFM</th>
<th>Sheet Metal</th>
<th>Flex Duct Size (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>40</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>50</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>60</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

**Testing & Commissioning**

Balance system to manufacturer’s specs. System imbalance lowers efficiency and may negatively affect delivered air temperature. Ensure HRV is capable of delivering airflow at the continuous rate (recommended at a medium-range speed setting). Never design systems for continuous high-speed operation. For 40 min. of ventilation and 20 min. of recirculation, use:

- HRVs: 15 x 7.5 x 1.5
- ERVs: 1 x 7.5 x 1.5

Minimum fan speed for intermittent ventilation is 20 min. per hour.

Educate homeowner: Always provide the manufacturer’s HRV system operations and maintenance manual and consider providing a customized ventilation manual.

**Delivered Air Temperature at Various Outdoor Temperatures and ASEs**

<table>
<thead>
<tr>
<th>Outdoor Air Temperature</th>
<th>40°F</th>
<th>60°F</th>
<th>80°F</th>
<th>90°F</th>
<th>95°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASE &gt; 85 Percent*</td>
<td>High Efficiency</td>
<td>High ASE leads to maximum comfort. The ASE of an HRV indicates how well the delivered air will be in winter and how cool it will be in summer. ASE lower than 85 percent may lead to comfort issues and therefore discontinued use of the system.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASE &gt; 80 Percent</td>
<td>High Efficiency</td>
<td>High ASE leads to maximum comfort. The ASE of an HRV indicates how well the delivered air will be in winter and how cool it will be in summer. ASE lower than 85 percent may lead to comfort issues and therefore discontinued use of the system.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRE &gt; 80 Percent</td>
<td>High Efficiency</td>
<td>High SRE keeps operating costs low. The SRE indicates how efficiently, but risks using higher fan energy.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Efficiency</td>
<td>Low Energy Costs</td>
<td>Heat recovery ventilator: The fan efficacy indicates the amount of air that can be moved per unit of energy used. Efficacy lower than 1.25 CFM/watt may still transfer heat from airstreams efficiently, but risks using higher fan energy.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Helpful Resources**

- Detailed product information: [www.hvi.org/proddirectory/index.cfm](http://www.hvi.org/proddirectory/index.cfm)

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*Performance measured at the lowest tested airflow using ASHRAE 62.2-2010.

**ERV vs. HRV information:**

- **ERV:** energy recovery ventilator
- **HRV:** heat recovery ventilator
- **ASE:** sensible recovery efficiency
- **SRE:** sensible recovery efficiency
- **ASE:** apparent sensible effectiveness

**Legend**

- CFM: cubic feet per minute
- HRV: heat recovery ventilator
- ERV: energy recovery ventilator
- Register: termination inside a room

**Figures**

- **Figures:** 1, 2, 3

**Figures 1, 2, 3**

1. Time to start duct layout and installation.
3. Duct layout and installation considerations.

**Figures 1, 2, 3**

2. Duct layout and installation considerations.