BY BRYAN UHLER

A Simple Ventilation Strategy

We're spec builders in western Washington state, and while we're not in the luxury home market, we do want to make sure our brand is associated with quality. That principle applies across the board, including in the area of home ventilation: When it comes to choosing and installing ventilation fans, we like to go a step beyond "builder basic."

Like any modern house, our homes have quite a few fans installed. For an example, consider the spec home we're currently building. This 3,800-square-foot house has a Panasonic Intelli-Balance 100 energy recovery ventilator (ERV); a Zephyr Gust kitchen range hood exhaust fan; and seven Panasonic WhisperValue bath fans with a variety of options.

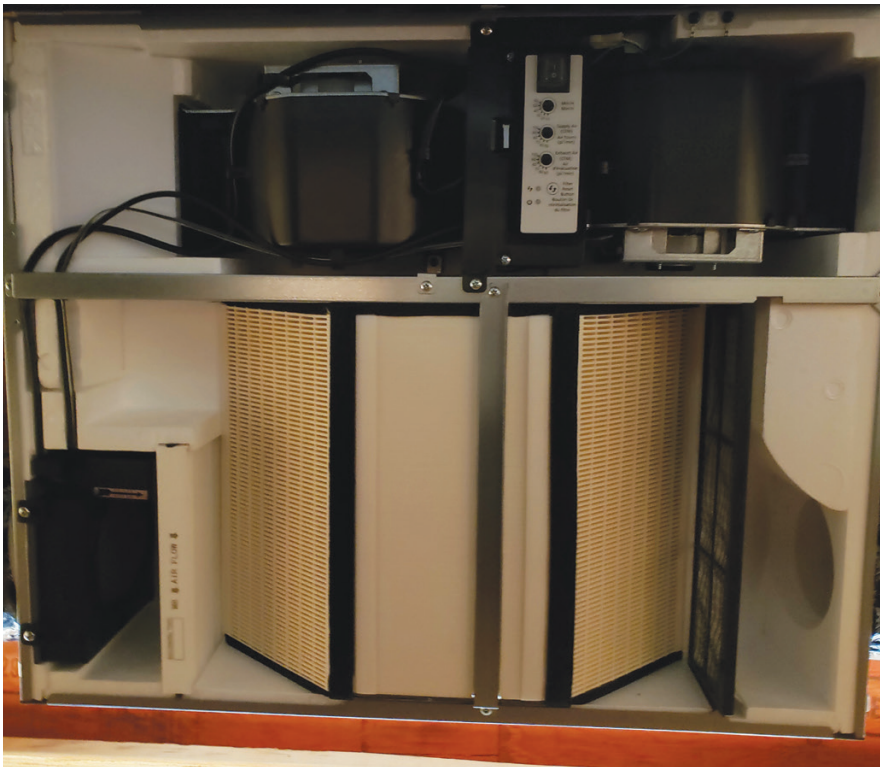
TWOFOLD STRATEGY

We test our homes for airtightness with a blower door. Code in our area requires every new house to test out at 5 air changes per hour at 50 pascals of pressure (5 ACH50) or better, but we choose performance options in the Washington state energy code that require us to achieve 3 ACH50 or better. We don't go all out to maximize airtightness (our tightest homes have measured between 1 and 2 ACH50); this is part of our general strategy to provide a high-performance home without pricing ourselves out of our market.

Homes that are tighter than 3 ACH50 require mechanical ventilation, based on the options that we choose from tables in the Washington energy code. To meet this criterion, we typically install a Panasonic Intelli-Balance 100 ERV, which can be adjusted to provide between 50 and 100 cfm (cubic feet per minute) of supply and exhaust airflow.

Our strategy for ventilation relies on a combination of continuous ventilation using the Intelli-Balance ERV, and intermittent ventilation using kitchen and bath exhaust fans and a utility-room exhaust fan. The ERV provides continuous fresh air to the house, while the ventilation fans remove moisture and odor at the point where they're created. We're not required to provide makeup air for the range hood, because it draws only 400 cfm.

In the past, we used an exhaust-only ventilation strategy, relying strictly on a point exhaust fan with a timer, located in the utility room. But that didn't allow us to control the source of our fresh air: Air drawn into the house came in through random cracks in the envelope, and it wasn't filtered. We switched to an ERV in order to provide a reliable source of fresh air and also to recover the heat contained in the outgoing air, including the enthalpy (the heat contained in the outgoing moisture). Using an ERV also helps us maintain a comfortable level of humidity in the home in the winter, when there's a tendency for the air to dry out, causing shrinkage of wood floors.



The inside of the Intelli-Balance 100 ERV is shown above. External controls on the unit allow the installer or owner to set the intake and exhaust airflow independently, allowing the house to be placed under a slight positive or negative pressure if desired. The unit accepts either a MERV 8 or a MERV 13 filter.

Photos by Tim Uhler and Bryan Uhler

One interesting wrinkle with the Intelli-Balance 100 is that the airflow speed of its intake and exhaust fans can be independently set using dials on the outside of the unit, in a range from 50 cfm up to 100 cfm. This means that the home can be set up to operate at either a positive or a negative pressure. In this house, we set the fan for supply-side inflow to be slightly higher than exhaust-side outflow. The idea is that this will compensate somewhat for times when the point ventilation exhaust fans are running; the rest of the time, the house will operate at a slight positive pressure.

The ERV draws in a steady supply of clean, filtered fresh air. But we don't rely on the ERV for removing polluted air from point sources of pollution in a house. Split over multiple bathrooms in a house, the ERV's 100-cfm capacity wouldn't divide out to provide sufficient exhaust, and extending ducting from the ERV to all those areas would be complicated. Instead, we use dedicated exhaust fans in the areas where air pollution and humidity are generated. This provides ample capacity and keeps the ductwork simple.

What about that point ventilation? There could be a temptation to simplify the specifying of exhaust fans by just ordering one type and calling it good. However, tailoring the fan unit to the specific room results in maximizing value while minimizing costs. It might seem like a small thing, but done correctly, the humble exhaust fan can be a selling point to differentiate a business from the competition.

EXHAUST FANS

At Pioneer Builders, we have had a good experience with Panasonic fans. From its products, we select the options for each fan according to the room it will operate in.

We've found Panasonic WhisperValue fans to be excellent fans to use. These fans are low-profile, and they are UL rated for ceiling or wall installation. While we're a new-construction, single-family

The author places a Panasonic WhisperValue fan, one of seven in the 3,800-square-foot house (above left). A look inside the housing shows the controls inside the fan that allow the installer to select an exhaust airflow of 50, 80, or 100 cfm (above right). The relative humidity set point of the room can also be dialed in for the condensation sensor.

residential builder, these fans would work well in retrofit or remodel situations as well. Remodelers who run into situations with shallower studwall cavities or ceiling joist cavities may find that this fan fits the bill. The fans' low profile may also be valuable in a multifamily situation where you don't want to penetrate a fire-rated ceiling.

The motor is an ECM (electronically commutated motor) that is engineered to run continuously. The motor increases the fan speed automatically when the unit senses static pressure, to maintain the selected cfm. The more bends in ductwork, the more difficult it is to push air through it. The fact is, not all ducting ends up being perfect, so having a fan that adjusts to real-world conditions is a valuable feature.

Another feature of these fans that we like is the manual adjustability of the fan speed. While there is a more powerful model, we typically install the one that can be set at 50, 80, or 100 cfm. We set the fans to 50 to begin with, which is the quietest setting, but also moves the least air. As part of our home-selling package, we include four visits to the homeowners for the first year after purchase, and one of the things we check is how happy they are with their fans. For example, if they aren't moving enough air out of the bathrooms quickly enough, we can increase the speed. At any cfm setting, these fans are very quiet: The noise created varies in a range from less than 0.3 sones (at 50 cfm) to 1.3 sones (at 100 cfm). They're also energy-efficient: The cfm per watt for the fan operation can range from 7.2 to 12.8.

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Like other fans in the Panasonic lineup, the WhisperValue is a versatile brand. You can buy the basic model, which is only a fan, or you can add in several practical modules including an LED (light emitting diode) light, an LED night light, and a condensation sensor. The option that we are most likely to include is LED lighting. Depending on the size of the room and the height of the

ceiling, that may provide sufficient light for the room. Note that the color temperature is 3,000 Kelvin, so you may want to take that into consideration when specifying lamp colors for additional fixtures located near the exhaust fan.

Another option that we specify depending on the room is a condensation sensor. We select units with sensors for high-humidity rooms, such as a bathroom with a shower or bathtub.

All this flexibility and performance comes at a price: These fans cost about double what a builder basic model would cost us. But the bottom line for the whole package of Panasonic equipment, including the ERV, is modest at about $2,000 (our cost).

ROOM BY ROOM

As noted earlier, in the 3,800-square-foot home we're currently building, there are seven WhisperValue fans, each one ducted directly to the outside using insulated flex duct. They are all the same base model, but the add-ons vary depending on where the fan is located.

The most basic fan is in the laundry room. This room has two light fixtures, so we installed a base model WhisperValue: fan only—no light—controlled by a simple wall switch.

Next up is a basement storage room. This room has plenty of lighting too, but we were concerned that it might experience elevated humidity levels. So we installed the fan model with a condensation sensor but no lights.

The powder room on the main living level has a unit with a fan, night light, and light, but no condensation sensor. With no shower or bath in it, this room has no significant source of humidity.

There are three full bathrooms, including a master bath. Each of these bathrooms received the full range of options: fan, night light, light, and condensation sensor. The master bath also has an adjoining water closet; for that room, we selected the unit with a fan, night light, and light, but no condensation sensor.

The wiring becomes complicated when you order the whole menu of options. You need separate switching for the fan, the night light, and the regular light, plus an unswitched continuous power supply for the condensation sensor. You have to plan for the boxes and circuits for all that. You'll want to make sure your electrician goes over the wiring specs for the fan carefully and understands what he's getting into.

Bryan Uhler is vice president of Pioneer Builders (pioneerbuildersonline.com), of Port Orchard, Wash. The company specializes in building high-performance homes. Follow him on Instagram: @pioneerbuildersinc.