

BY TED CUSHMAN

Plug-and-Play ERV for Retrofit Work

Tight buildings need fresh air. But mechanical systems that supply fresh air come at a cost that can put a strain on budgets—especially in remodels, where you might have to demo existing ceilings and walls to install the supply and return ductwork for a high-performance energy recovery ventilator (ERV). That's the problem the German firm Zehnder is trying to solve with its latest U.S. introduction, the ComfoAir 70.

Unlike Zehnder's full-size, whole-house ERV models (the ComfoAir 550, 350, 200, and 160), which have large central air handlers installed in a mechanical room and require the design and installation of extensive ductwork in floor and wall cavities, the new ComfoAir 70 is a simple one-piece unit that mounts through a side wall in the living space and needs no ducts. Each unit exhausts stale room air and supplies fresh outdoor air through small openings on the sides of the appliance.

Priced at \$1,250 and sized to provide fresh air for about 600 square feet of living space, the ComfoAir is a good match for small spaces—and of course, the more

units you install around the building, the more space they can serve.

The ComfoAir 70 enters the U.S. market on the heels of another European-made compact wall-mounted air exchanger, the Lunos e2, which—along with a smaller companion device, the Lunos eGO—is available in the U.S. from the New York firm 475 High Performance Building Supply. The Zehnder and Lunos systems both mount quickly through a simple hole in a side wall, both offer balanced ventilation, and both have heat recovery. But they operate differently: The Lunos e2 system uses a matched pair of through-wall units with heat-storage cores, set up to operate in tandem on a 70-second cycle, so that one unit exhausts stale air while the other unit draws in fresh air. A thermal-mass core in each member of the Lunos tag-team stores heat from the outgoing warm air, then returns the heat to the incoming fresh air when the fan reverses. The ComfoAir 70, by contrast, does continuous intake and exhaust through just one unit, exchanging heat directly from the outgoing airstream to the incoming airstream through an “enthalpy” core, just like the larger central ComfoAir systems (and like most other ERV systems on the market).

Although both systems are compact and easy to install, the internal transfer core gives the Zehnder ComfoAir an advantage over the Lunos. Like its larger cousins, the ComfoAir transfers humidity as well as heat—that's why it's an “energy recovery ventilator” (ERV), not just a “heat recovery ventilator” (HRV). The ComfoAir also filters the incoming fresh air, and the enthalpy core can be removed and washed (in fact, the core must be cleaned on a regular basis for the unit to perform properly).

INSTALLATION

In June, *JLC* went on site with remodeler and home-performance contractor Jim Bradley, of Caleb Contracting, in Cambridge, Vt., to see two ComfoAir 70 units installed for a deep energy retrofit on a country house. These are the first two ComfoAir 70 units sold in the U.S., so Zehnder's U.S. rep, Norbert Wesely, was on the job to help out.

Jim Bradley's crew had already carried out an extensive reconstruction of the home's wall system, turning the existing underperforming fiberglass-insulated 2x6 stud wall into an airtight superinsulated double wall assembly with an intelligent vapor barrier on the inside



Guided by a template supplied with the ComfoAir 70, carpenter Matt Burstein drills a pilot hole through a home's superinsulated wall. He uses a bit long enough to pass through the 11½-inch wall and keeps the bit level with the help of a torpedo level (1).

Photos by Daniel Bradley

face, a plywood air control layer in the wall center, and a vapor-open exterior drainage-plane membrane.

To install the ComfoAir 70, the crew had to bore a cylindrical hole through this multilayer assembly, then install a plastic through-wall protective pipe for the unit's polypropylene-insulated intake and exhaust vent duct, sealing the pipe to the interior and exterior membranes with tape. Carpenter Matt Burstein started by positioning a cardboard template (supplied with the ERV) on the wall between two studs, at a height to provide the end users with easy access to controls on the front of the appliance. Burstein then drilled a pilot hole through the wall at the center of the required 10.63-inch-diameter opening. The pilot hole would serve as a guide for making the larger hole needed to install the Zehnder's through-wall pipe.

Outside the building, Burstein used the cardboard circle from the template to lay out successive cuts through the wall material, starting with the wall's ProClima Solitex Mento drainage-plane fabric, and continuing through a layer of Roxul rock-wool insulation and the inner stud wall's plywood sheathing.

On the inside wall, Burstein traced and cut out a circular hole in the drywall, then a larger rectangle that would give him access to make an airtight connection between the interior ProClima Intello smart vapor retarder and the Zehnder unit's plastic pipe. After the hard plastic pipe was installed through the wall, he taped the inside and outside joints using ProClima Tescon Vana tape.

Inside the house, HVAC technician Jason Marias, of Locals Heating (Underhill, Vt.), roughed in the required hard-wired connection for the ComfoAir. The unit can run on 120-volt or 240-volt power, but the current has to be stepped down for the appliance's four-speed 24-volt fan. Marias installed a junction box in the wall behind the Zehnder's planned location, then helped Norbert Wesely wire in a transformer (supplied with the unit).

Next, Marias and Wesely mounted the Zehnder's metal housing onto the wall with drywall anchors. Finally, Wesely slid the insulated air duct of the unit into the through-wall pipe and pushed the ERV into place in its housing (a snug fit).



After locating the center of the required through-wall opening, Matt Burstein lays out a 10.63-inch circle using the cardboard template, and cuts the hole (2). He'll save the larger rectangular piece and use it to patch the wall after sealing up the wall's interior air and vapor barrier. Outside the house, Burstein carefully cuts and peels back the wall's exterior drainage-plane fabric, then uses the same piece of cardboard to scribe for cuts in the rock-wool insulation and mid-wall plywood sheathing (3). After installing the through-wall protective pipe for the ComfoAir's two-way intake and exhaust duct tube, he carefully tapes the pipe to the exterior fabric again, to re-establish the watertight and airtight (but vapor-open) outer weather-resistive barrier (4).



Once the circuits are properly wired, the plastic protective pipe is installed through the exterior wall, and the metal housing is mounted, the appliance can be set in place (5). On the outside wall, Jason Marias cuts the protective pipe and the insulated air ducts flush to the exterior trim, using a Makita multi-tool (6). The final touch: Norbert Wesely screws the vent hood in place over the intake and exhaust openings (7).

The ComfoAir's through-wall pipe and insulated air tube are long enough to reach through a 2-foot-thick wall. For thinner wall sections—as in this example—the pipe and tube can be cut to fit. But because the unit's fan is housed within the through-wall tube, there's a minimum wall thickness. Even Jim Bradley's 11½-inch-thick wall had to be packed out to 12½ inches with a piece of 5/4 material before the ComfoAir tube would fit.

In a typical 2x6 wall, leaving room for the fan would require the tube to project past the wall surface by almost 6 inches, so the wall would need to be built out on either

the inside or the outside to accommodate the appliance.

Whatever the trim detail, once the tube is cut flush with the wall exterior, the intake and exhaust tube is caulked and a vent hood is attached.

OPERATION

According to Norbert Wesely, the best way to operate the ComfoAir 70 is to set it and forget it: Leave the dial set to whichever of the four fan-speed settings best matches the home's routine fresh-air needs and run the unit continuously. Then, he says, you can bump the speed up as required for an

occasional high-demand situation, such as a house full of party guests. And Wesely notes that routine maintenance is required for the appliance, as it is for any high-performance ERV. Filters should be checked every three months and replaced as needed.

The ComfoAir 70 doesn't require ducts to operate. But you can hook short runs of ductwork up to it. That's handy in certain situations. For instance, you could set the unit up to draw stale air from a kitchen or bath and deliver fresh incoming air to a living room or bedroom suite.

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