

Frequently Asked Questions

Why would I need an energy-recovery ventilator like RenewAire?

As houses become more and more airtight, it will become more and more common to see energy-recovery ventilators in homes. Air-tightness follows from the use of improved building practices and products, like air barriers, better seals on windows and doors, panelized construction, air-sealing procedures, and sealed-combustion furnaces and water heaters.

People like the benefits of air-tightness in their homes, including improved energy efficiency, fewer uncomfortable drafts, and the exclusion of noise and dust from the outside. What is lost, however, is the natural infiltration that used to carry away the indoor pollutants: carbon dioxide, formaldehyde, cool-weather moisture, cooking odors, and other gases coming from building materials and cleaning compounds.

In old houses, natural infiltration was so effective in removing these pollutants that often, more water was carried away than was generated in the home by the breathing, washing, and cooking of the occupants (thus the need for additional humidification in older homes). Nowadays, that water isn't removed from the new, tighter houses, unless a ventilation system is in use, so windows can be damaged by the moisture build-up. With "run-away humidity" insulation loses its effectiveness, and in severe cases, structural damage can occur.

Even though we do not know everything about pollutants in homes yet, there is real concern. Formaldehyde originating in various board products and insulations caused significant problems in the building products industry. Changes in product formulations to try and reduce the amount of formaldehyde because of possible health concerns have only been partially successful. There are other pollutants that may be of concern. A common one is carbon dioxide, which in excess concentrations can cause lethargy and lack of alertness. We all generate carbon dioxide by breathing, but it can be very effectively controlled by air-to-air heat exchangers. A ventilation system provides better indoor air quality.

How does the system work?

A RenewAire ventilation system exhausts stale air from the house. At the same time it draws in fresh outside air. Within RenewAire's energy-exchange core, heat and moisture is transferred from one air stream to the other - but each air stream is kept physically separate. The fresh air stream is automatically preheated, or pre-cooled, depending on the season.

The result is that the pollutants in the inside air are regularly exhausted to the outside - but the winter-time heat (or summer-time coolness) in the household air is largely recovered, so that you can afford to ventilate without a large impact on your heating or cooling cost.

What will RenewAire do for me?

Most importantly, it will give you cleaner air to breathe, letting you and your family feel better and healthier. It will do so in the most consistent, controlled, safe, and energy-efficient manner possible.

In winter, the RenewAire system will control damaging high humidity in the home.

RenewAire also controls the difference in air pressure between the inside and the outside of the home. It reduces the amount of cold air entering the house around doors, windows, and other leaks, all of which can give you a cold, uncomfortable feeling. Now all the ventilation air brought into your home is directed into your heating ductwork or to a central location. At the same time, that ventilation air is made to recapture most of the energy that would otherwise be lost through ordinary ventilation.

Is RenewAire an air filter?

Filters work by pulling fine, air-borne particles out of an air stream. Some filters are very good at removing particles from air, but filters can't pull gas pollutants out of the air.

Air-to-air heat exchangers control indoor gas pollutants by bringing in outside air. The filters inside RenewAire are there strictly to prevent fouling of the RenewAire core.

Even the best filter, if installed as part of a RenewAire system, can only screen out the particles coming from outside. In most installations, RenewAire systems bring in only small amounts of air-borne particles. The other sources for dust, pollen, and other air-born particles (many inside the home) are much more significant.

People who are concerned about removing fine particles from the air in their homes need to use high-efficiency (HEPA) filters on their furnaces, which treat a high volume of household air. That is the only way to effectively deal with particles in the air inside the home.

Is RenewAire certified by an independent testing agency?

RenewAire products currently carry certification from both HVI and ARI. The Home Ventilating Institute HVI has tested and certifies the performance of residential units for approximately 10 years. HVI uses the Canadian CSA 439 test protocol. This tests for airflow, temperature and total (heat and humidity) efficiency, cross leakage, and low temperature (-13° F) performance. RenewAire not only passed these tests to achieve certification, but also rates among the highest performing products in all categories. In January of 2001, certified test results from ARI-1060 were first published.

RenewAire uses one of the largest energy-recovery cores in the industry, relative to airflow rate. And our plate spacing is very close (the plates are the dividers that separate the air passages and transfer energy from exhaust air to fresh air). That means we can pack a lot of exchange area into a small volume. Most other manufacturers use smaller elements with larger plate spacing. This is a major reason why RenewAire efficiency is among the highest tested.

Are RenewAire products UL-listed?

In 1986 a RenewAire unit was the first HRV to be tested under UL's special category for Ducted Heat Recovery Ventilators. Our products continue to be UL Listed. Our factory is regularly inspected by UL, as part of an ongoing safety and quality inspection program.

What kind of warranty protection is available from RenewAire?

RenewAire provides a ten-year warranty on the core. All other components carry a two-year warranty.

Why is RenewAire the best available way to ventilate?

While there are other ways to provide controlled ventilation in your home, thus reducing gaseous indoor air pollution, here are four reasons why RenewAire is the BEST:

- Balanced Ventilation is safest for you and your home - can't back-draft chimney-vented appliances, and won't pull or push moist air into your home's insulated walls.
- Enthalpy Exchange means RenewAire can recover heating (or cooling) energy efficiently, without interruption, winter or summer - core stays dry, with no need to compromise heat recovery for defrosting.
- Simple design means easy installation and reliable operation.
- Time-tested, documented performance. We have been manufacturing energy-recovery ventilators in Madison, Wisconsin since 1983. Tens of thousands of RenewAire units are installed throughout the United States, providing reliable, efficient service.

If RenewAire recovers moisture, can I still get rid of excess winter humidity?

RenewAire is effective at controlling excess winter humidity in tight houses because it doesn't recover all of the moisture from the exhaust air. The RenewAire core is designed to recover less moisture than heat, so plenty of excess moisture is exhausted out of the house. And because cold-weather air is very dry, the long-term effect is making the house dryer.

Excess winter humidity is one of the top problems people solve with RenewAire. Studies show that enthalpic-transfer ventilators like RenewAire, when operated at the ventilation rates recommended to control poor indoor air quality, have plenty of moisture-removal capability in cold climates.

What does moisture transfer do for me in the summer?

Plenty! When ventilating in the summer, the challenge is to keep the excess moisture in the outside air from coming in. That is the opposite of the situation in the winter, when ventilation is

used to get rid of excess moisture generated inside the house.

If the air inside the home is dryer than the outside air - when air-conditioning, for example - the RenewAire core transfers much of the excess moisture from the incoming ventilation air to the outgoing exhaust air. This reduces both the excess heat content and the excess moisture content of summer ventilation air by about two-thirds, overall. Without the moisture transfer feature, the moisture content would rarely be reduced at all.

Since dehumidification is a major part of the work an air-conditioning system does, this excess moisture reduction feature is critical in maintaining the energy efficiency of summer-time ventilation. In typical hot weather, humidity may represent 60% of the energy that needs to be removed from outside air. Other products that can't control this humidity perform very poorly in the summer, compared to RenewAire.

Will RenewAire Units dehumidify my house in the summer if I'm not using air-conditioning?

The dehumidification effect that RenewAire provides in the winter is absent or very minor in the summer. In a house without air-conditioning, the water content of the air inside and outside of the house is virtually the same, so air exchange won't provide any humidity control, although it will reduce other indoor air pollutants. Of course, if the RenewAire system is set up to exhaust from the bathrooms, you can use it for that purpose year-round.

So should I use the RenewAire system with air conditioning?

RenewAire systems work very well with air-conditioning - much better than sensible-only heat exchangers. As in the winter, if you keep your house closed up tight, (as you should when air-conditioning), indoor air quality will suffer. The only real difference is that air-conditioning systems do have some moisture-removal capability, unlike heating systems. Exactly how much water the air-conditioner will remove depends on how it is set up.

If you operate your air-conditioning system day after day, keeping your home closed up tight, you should use your RenewAire system to ventilate. It will bring in fresh air, just as it does in the winter. The fresh air from the RenewAire will be warmer and moister than the house air, but it will be cooler and dryer than the outside air. As in the winter, the operating cost to ventilate with RenewAire will be very low.

Finally, some people like to use RenewAire in the summer just so they can ventilate without opening windows, either for security or to avoid rain coming in open windows. That works well, and RenewAire always allows you to bring in fresh air that is as close as possible to your inside air temperature and humidity.

I have a spa room, and the only pollutant I'm worried about is humidity. Do I have to use the moisture recovery feature?

Spa rooms and pool enclosures are two of the rare applications where units that don't transfer moisture are a better choice. As a rule of thumb, if a spa room is less than third of the total

exhaust air volume, a RenewAire unit can still be a good choice. Almost all other situations are better served by RenewAire's standard core.

What is the RenewAire core made of?

The RenewAire core is a carefully designed, highly engineered resin composite material, developed over thirty years ago specifically for energy-recovery ventilation systems. It resembles corrugated paper, but it really isn't - any more than the high-tech tires on modern cars resemble the rubber in pencil erasers. The RenewAire material has been imitated, but its optimized balance of high heat transfer, moderate moisture transfer, and low gas transfer rates has never been reproduced.

RenewAire's hydroscopic resins act as highly selective molecular "conveyer belts" or "water pipes", that carry water vapor as individual molecules from one side of each heat transfer membrane to the other. Very low numbers of extraneous molecules are carried across the membrane.

Another way to think of how RenewAire works is as a special type of window material. Glass in a window lets both light and heat enter your home, while keeping out dirt and outside air. The material in RenewAire lets through heat and water vapor, but doesn't let air or other gases through.

Installations employing this technology began in the U.S. during the late 1970's. Today over 60,000 units are in service throughout North America.

Several competitors have recently offered another fixed-plate enthalpic element. They use a completely different approach to moisture transfer: porosity. The material has relatively large pores that allow a number of different molecules to pass freely between air streams, without any screening. That means that carbon dioxide is recovered in dramatically higher percentages than in the RenewAire core. These products also have slightly lower in sensible performance, and have virtually no track record.

Enthalpic energy recovery seems to deliver a number of benefits. Do any other manufacturers offer this kind of technology?

A few competitors use different approaches to provide the heat- and moisture-recovery functions of the RenewAire core. We feel they do not succeed in matching the overall performance superiority of RenewAire.

Besides the plate exchange units that imitate but do not match RenewAire performance, there are other types of enthalpic approaches using the "desiccant-coated heat wheel". This approach can provide relatively high energy-recovery performance. But it has major liabilities that degrade its overall value: high maintenance, difficulty of installation, and wheel seal cross-leakage. The drive belts are scheduled for replacement every two years. Hanging these units and connecting ducts are difficult and time-consuming. The technology requires use of an electric pre-heater to prevent frost damage in northern climates. Finally, these units have 10%+ cross-leakage of

exhaust air back into the fresh air past the seals around the moving wheel, and there may be additional carry-over of water-soluble pollutants in the desiccant.

While enthalpic heat wheels can perform well in large, tightly engineered systems utilizing molecular sieves and purge cycles, at residential scales they are an expensive alternative- more potential trouble than they are worth.

No other enthalpic-transfer technology available today delivers all the benefits of RenewAire.

Why doesn't the RenewAire core freeze up?

For the very simple reason that no condensate forms. Without water in the liquid phase, no solid ice forms in the RenewAire core, which can keep functioning without interruption in typical winter conditions.

Does the RenewAire core itself block up with dust?

No. Once air enters the core itself, its velocity is too high for air-borne particles to settle out. Even in smoky bars, the interior of the core stays remarkably clean. Vacuuming off the face is sufficient to keep it functioning properly.

The RenewAire's energy-transfer core is designed to transfer some water vapor. Does that mean it will transfer other pollutants as well?

The core in RenewAire was designed to transfer an optimum amount of water vapor (in the gas state) and a minimum amount of other gases. The RenewAire core has low levels of transfer of other gases, and excellent separation of the two airstreams themselves. The transfer levels are documented for a number of gases of interest; for example, the transfer rate for carbon dioxide is about 3%, that for gases in smoke is less than 2%. This is far better than any competitors' residential-scale enthalpic transfer systems.

RenewAire is not designed for the removal of toxic or highly dangerous vapors, as might be found in a laboratory. It is designed to reduce and control the concentration of typical pollutants already found in the home, using a dilution strategy. So a low level of transfer of some of the exhausted pollutants poses no problem in almost all cases. In unusual instances where a specific gas pollutant is of interest, we may be able to provide data on recapture behavior.

With all that water being transferred I'm worried about germs and bacteria building up in the unit. Does that happen?

Laboratory tests confirm that RenewAire is not hospitable to microorganisms. In the RenewAire core, moisture is transferred as a gas, not as liquid water. By staying dry, the core denies germs the environment in which to propagate. In fact, bacteria deliberately injected into the RenewAire core material was found to have died within a short time.

In contrast, consider the situation in the typical condensing-type air-to-air heat exchanger

constructed of metal or plastic. In many conditions, water is condensing in the core, draining out over wetted surfaces, then being collected in drain pans. This is the perfect environment for biological growth.

How is the system installed?

The RenewAire unit is usually installed on a wall inside the mechanical room. Two insulated ducts connect the unit to the outside: one to get rid of stale air from the house, one to bring in fresh air from outside. One, two, or more ducts are used to collect stale air in the house, often in bathrooms; these are connected directly to the RenewAire unit. The fresh, tempered air provided by the unit can be ducted into the home's furnace or air-conditioning ductwork.

Do I need a forced-air heating system to install RenewAire?

RenewAire can be installed in homes with any kind of heating system. With hot-water heat, for example, it's easy to install a duct from the RenewAire to one or two central locations in the home. Very simple installations can be very effective.

Why doesn't RenewAire need a condensate drain?

RenewAire is different from many other air-to-air heat exchangers because it is designed to transfer both heat and moisture from one air stream to the other. This very special feature eliminates condensation under almost all conditions. For example, in typical winter weather, the warm, relatively moist household air transfers most of its heat to the incoming air stream as it passes through RenewAire's core. It also transfers just enough of its moisture to the incoming air to avoid condensing. This moisture is in the gas state so the inside of the RenewAire stays dry, unlike most other products that collect the moisture as liquid water and must drain it away.

So I can install RenewAire anywhere - even in a room without a floor drain?

Some locations are easier than others, but RenewAire can be installed almost anywhere, as long as they are accessible for changing filters. Even better, a RenewAire unit can be installed in any convenient position, because there are no drain pans that must be located at the bottom of the unit.

Do I need many special accessories to install RenewAire?

RenewAire units are easy to install with the standard duct components, grilles, wall caps, and controls that most wholesalers already stock. You can use the same style wall grilles as in the rest of your heating or cooling system, and virtually any line-voltage controls will work with RenewAire. Heating contractors often have the components they need to install RenewAire in their service trucks already. Of course, RenewAire also provides a line of controls and accessories that are convenient to install and use.

How should I control my RenewAire system?

Some manufacturers suggest you run their ventilation products continuously: "just plug it in and walk away". We believe it makes more sense to run RenewAire on a controlled basis: "run it only to provide the ventilation you need". Most people elect to control RenewAire systems with a proportional timer, a 24 hour timer, or with a dehumidistat. Use a dehumidistat if your primary concern is controlling excess wintertime moisture. Use a timer otherwise, particularly if you plan to operate the system in the summer, or are worried about indoor air pollutants originating from building materials.

It is also possible to install manual switches in bathrooms, since many installations use the RenewAire system to provide bathroom exhausts. These can be push button activated timers, spring-wound timers or simple on-off switches.

In the future, expect to see more sophisticated control schemes, including occupancy and carbon dioxide sensors. Costs for these controls, which are already showing up in larger installations, continue to come down.

Other control schemes can make sense too. The main point is to make sure the system runs regularly to provide plenty of ventilation. Most systems run almost all the time; in early winter, for example, many systems need to run twenty-four hours a day to control excess moisture.

Why is RenewAire a single-speed unit? Isn't low-speed operation more efficient?

We believe its best to operate a RenewAire - or any other unit - at its full rated speed. This provides the best overall performance, when considering the amount of air moved, the electrical efficiency of the blower, and the total energy recovered. Let's take those points in order:

The primary goal of an energy-recovery ventilator is to ventilate. RenewAire systems are designed to run for all or most of the day, moving enough air over a day's time to control the pollutants generated inside the home that day. Most competitors' products can't provide sufficient ventilation rates without running on their high speed much of the time.

Blower wheels in fans are designed to move the most air per watt at a certain speed, generally its full, or "top" speed. At lower speeds, the wheels perform less efficiently, and the electric motors driving the wheels are less efficient too. So a given blower will use less electricity to move a given amount of air at its full speed than it will at its half speed.

While the energy recovery efficiency of any heat-transfer core will go up as air speeds go down, there is less energy to recover because less air is being moved. So the total amount of energy recovered is less at lower speeds than at high speeds. It's a little like the mileage figures your car delivers while it's standing still: your engine uses very little fuel while it's idling, but because you aren't going anywhere, your mileage is infinitely poor!

Besides keeping the product simple and inexpensive, single-speed blowers are less likely to fail, and our overall heat exchange effectiveness is so much higher than most others, that we can just operate the RenewAire at full speed for the period as needed.

Other manufacturers like multiple fan speeds because they can use the efficiency figures they get

at very low speeds to make their cores look better. Our efficiency numbers look better at low speeds, too. But remember to compare the efficiencies of competitor's products when operating at the speeds necessary to deliver ASHRAE-recommended ventilation rates! At comparable airflow rates we beat almost everybody - even before considering the latent energy only we can recover. In fact, at our rated "high" speed we deliver recovery effectiveness better than most of our competitors achieve at their low speeds!

Some people like the idea of the ventilation system running constantly, with high-speed operation as needed to control humidity or to ventilate bathrooms. But ASHRAE accepts regular, intermittent ventilation as an effective strategy. We feel there is no significant advantage to the "constant low-speed/boost" strategy, and plenty of disadvantages. This is particularly apparent if you would try to detect any airflow from the furthest grill on a competitors unit running at half speed. You need to move air to provide effective ventilation.

How expensive is RenewAire to run?

The blowers in RenewAire products are very inexpensive to operate. Take an EV130 RenewAire unit, running 90% of the time during a six-month heating season. The blower cost will be about \$34 for that period - less than 20¢ a day (with electricity at 7¢ per kWh).

Will my heating or cooling costs go up?

Because RenewAire recovers most of the heat energy in the exhaust air (in the winter), this is the least expensive kind of ventilation system to operate. RenewAire is also much less expensive to operate than a dehumidifier sized to accomplish a similar amount of wintertime moisture removal.

In fact, most people report little or no impact on their heating or cooling bill, but this can vary depending on many factors. Sometimes the RenewAire system replaces ventilation practices (like opening windows) that were formerly used - so while the total ventilation rate goes up, energy cost doesn't change, or even goes down. And, in some cases, the balanced ventilation feature of RenewAire may reduce the household pressurization that normally drives natural infiltration.

If all these factors are ignored, it is possible to estimate the worst-case additional cost to replace the additional energy that RenewAire can't recover from the exhaust air. For a typical 2500 square foot house in the upper Midwest or New England, in a 7000-degree day, six-month heating season, that additional energy might cost \$30 to \$40 with gas or oil heat. So the total cost of fresh air in this example would be less than 40¢ per day (including electricity for the blowers).

Without energy recovery, the cost to heat the incoming fresh air might be \$100 to \$140. The savings are even greater with electric heat. Variations from house to house do make it hard to calculate the savings. But without question, energy recovery, as a feature of a ventilation system, does generate a payback through reduced energy costs - in addition to the other benefits a ventilation system provides.

What maintenance is required?

Filter cleaning is the main regular maintenance item. The easiest way to clean the long-lived filters is vacuum them with a hose attachment. Inexpensive replacement filters are available. The installing HVAC contractor is the primary contact for replacement filters. As an alternative, you may want to make your own filters. Filters may be cut from a sheet of 3/4"-1" firm, spun polyester "hog hair" filter media or material, similar to the existing green/blue filter in the residential unit. Cut to the existing size of the filter and install between the core and the incoming air stream. For all other inquiries, please contact RenewAire LLC.

Once a year the RenewAire core itself should be vacuumed off, and that is a good time to vacuum out any other dust found inside the unit.

Finally, the outside wall caps where fresh air is brought in, and where stale air is exhausted, should be checked seasonally to make sure they are not blocked.

What is the life expectancy of the RenewAire core?

The RenewAire core was designed to perform with a service life of 20+ years. Since introduction of the technology in the early 1970's, millions of these cores have been operating throughout the world with a virtual zero failure rate. Moreover, it has been well documented that both heat and moisture characteristics of RenewAire cores have not changed significantly when measured over time.

Among our competitors' desiccant-coated heat wheels, on the other hand, few are expected to perform optimally for more than 10 years.

How about the life expectancy of the rest of the RenewAire unit?

The only moving parts in RenewAire units are the blowers. The blowers used have a rated mean run time until failure of 80,000 hours. That is equivalent to over thirty-three hundred days of continuous operation (Or twelve years if used continuously for nine months out of every year). Filters may require replacement, depending on the method used to clean them.