

How Energy Recovery Ventilation Works

Simple science can help you achieve total indoor comfort.

Controlling fresh air in your home is an important aspect of maintaining good indoor air quality. A good ventilation system will protect your family from unpleasant odors and harmful contaminants such as radon, formaldehyde and VOCs.

There are simple ways to increase ventilation. Opening a window or installing a fan can facilitate more airflow, but these aren't the most effective or energy-efficient solutions. Unless conditions are just right outside, the air in your home can become too warm, cold or humid. You may not be able to remove all the pollutants from inside and could even introduce new contaminants into your home.

A whole-home energy recovery ventilator (ERV), such as Aprilaire Model 8100 Energy Recovery Ventilation System, will exchange stale, polluted indoor air with fresh, clean outdoor air throughout your entire home without wasting energy. That means a healthier, more comfortable indoor environment for your family and savings on your heating and cooling bills.

How Energy Recovery Ventilation Works.

One of the benefits of using an ERV is that it transfers heat and moisture between incoming and outgoing airstreams. This means it takes much less energy to heat/cool the air you bring into your home, ultimately saving you money on heating and cooling costs.



Wintertime example

During the winter: As your stale, hot indoor air is expelled, it preheats the fresh, cold outdoor air that's coming in. You will use much less energy to heat the air once it gets inside.

During the summer: As your stale, conditioned indoor air is expelled, it removes heat from the fresh, hot air that's coming in. This cools the incoming air and reduces the energy needed to cool it to a comfortable level inside.

The Science Behind Energy Recovery Ventilation.

Heat transfer

So how exactly does this heat transfer take place? Basically, a simple transfer of energy occurs in the EnergyMax® Transfer Core, using enthalpic technology based on the second law of thermodynamics. This law essentially states that energy will spontaneously move from areas of high energy to areas of lower energy.

What we know as “temperature” is actually a measure of the average kinetic energy of molecules in a substance. When two substances with different temperatures meet, energy (i.e. heat) is transferred from the high temperature substance to the low temperature substance.

The transfer of energy is never complete, but if given enough time, heat will be transferred to the lower temperature substance until the two have equal temperatures. It's similar to mixing one cup of hot water and one cup of cold water to make two cups of warm water.

Moisture transfer

Energy recovery ventilators transfer moisture similarly to how they transfer heat. An ERV heat exchanger is usually made of a different material, often paper, so that moisture can transfer between incoming and outgoing air. Like temperature, moisture in the air will move from an area of high concentration to an area of low concentration. This is how the EnergyMax® Transfer Core works in the Aprilaire Model 8100 Energy Recovery Ventilation System (ERV).

During the winter: As it's expelled, your warm, humidified indoor air transfers moisture to the cold, and typically dry, outdoor air that's coming in. Therefore, you will use less energy to humidify the air once it gets inside.

During the summer: As it's expelled, your stale, dehumidified indoor air steals moisture from the fresh, humid air that's coming in. Therefore, you will use less energy to dehumidify the air to a comfortable level once it gets inside.

Save on Energy with Aprilaire Whole-Home Ventilation Solutions.

The Aprilaire Model 8100 Energy Recovery Ventilation System (ERV) boasts low maintenance and operating costs. Because it only uses energy to circulate air, it is very efficient and often generates far more in energy savings than what is needed to operate. To find out what ventilation system is right for your family and home, visit aprilaire.com to locate an Aprilaire dealer.