

**ENTHALPY WHEEL = ENERGY COST SAVINGS**

Desert Aire's enthalpy wheel recovers a significant amount of energy from exhaust air. This wheel is a rotary counter flow air-to-air device that transfers both sensible and latent heat between air streams. Filtered outdoor air encounters the upper half of the wheel while filtered exhaust air flows through the lower half of the wheel. As the wheel constantly rotates during ventilation, it recovers valuable energy. Except for its rotation, the wheel is a passive device. Its function basically reverses between summer and winter. Figure 2 on page 2 shows the differences. For more information, read Desert Aire's Technical Bulletin 19 -Energy Recovery Wheel Technology.



*Figure 1 - Enthalpy Wheel Installed in a Desert Aire Aura™ Unit*

Desert Aire's wheels contain a patented molecular sieve coating that selectively adsorbs and desorbs water molecules in the air. This thin molecular sieve coating permanently adheres onto a sea water resistant aluminum alloy that is composed of wave and flat, continuously wound layers to guarantee laminar flow and low static pressure loss. The wheel matrix, or its total mass, provides for highly effective sensible and latent energy exchange.

Most other media will have the desiccant coated, bonded or synthesized onto the matrix. The desiccant material must usually be applied as a thick coating layer that is subject to delaminate or erode off the media through the normal life expectancy of the wheel. In contrast, the desiccant on Desert Aire's media is designed to permanently adhere to the surface of the aluminum alloy.

Our design offers excellent face flatness to minimize wear of the inner seal surfaces and reduce cross leakage while offering a minimum life expectancy of 15 years. Our wheel frames are constructed of evenly spaced spokes, a galvanized steel band and an aluminum center hub. Frame component sizes and number of parts vary with wheel size.

We use a fractional horsepower AC drive motor and a durable multilink drive belt as our standard drive system.

It is not uncommon for frost to develop on the wheel under extremely cold winter conditions. The wheel can cool down to below 32°F and will then freeze moisture from the exhaust stream. Frost may reduce the airflow, but it will not damage the wheel.

## Summertime Operation

In summer, ventilation air transfers its heat to the mass of the wheel. When the wheel turns into the exhaust air stream, it releases its heat. This significantly cools ventilation air even before it reaches the evaporation coil. But the wheel also assists with dehumidification. Its media is impregnated with a water-selective desiccant (4Å molecular sieve) that captures moisture from outdoor air. When the wheel turns into the flow of drier exhaust air, moisture is released. This reduces the moisture load on the dehumidification coil.

## Wintertime Operation

In winter, sensible heat is transferred from warm exhaust air to cooler ventilation air. This heat transfer works in reverse to that of summer because the exhaust air is much warmer than the incoming air from outdoors.

The transfer of moisture is also reversed. The wheel recovers moisture from the exhaust air and deposits it into the dry, cold incoming air.

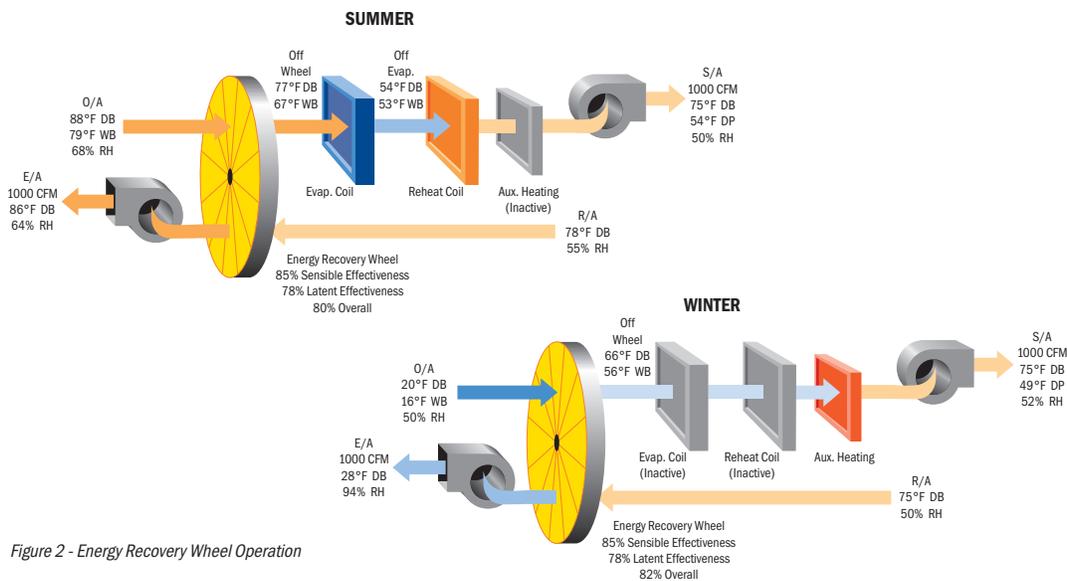


Figure 2 - Energy Recovery Wheel Operation

## Reduced Loads

The energy recovered by the wheel significantly reduces sensible heating and cooling loads. Likewise, the load on the refrigerant dehumidification system is also reduced allowing you to use a smaller TotalAire™ dehumidifier.

While the wheel cannot meet the full moisture load alone, it can greatly reduce peak loads on the dehumidifier, especially when there is a large difference in moisture content between the air streams. Dehumidification through refrigeration is a standard industry approach.

However, integrating an energy recovery wheel into this type of system allows the dehumidifier to work more efficiently. The wheel significantly decreases the dehumidifier size required to ensure a complete year-round solution. Its impact is so great that it reduces the required compressor capacity by approximately half.

## OPTIMIZING SOLUTIONS THROUGH SUPERIOR DEHUMIDIFICATION TECHNOLOGY

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