

FRESHAIR EVACUATOR ENERGY RECOVERY SYSTEM



Introduction

Source capture strategies and technologies have evolved to where they can assist in removing the airborne byproducts of water disinfection from the pool facility, improving the quality of the air and water. They should be used in any indoor pool designed to hold a large number of swimmers or swimmers who will be in the water for long periods of time or when energy recovery of exhaust air is desired.

These source capture strategies employ bench, drain and wall-mounted systems positioned along the sides and decks of pools. They work in concert with code-mandated ventilation standards that deliver supply air through a carefully designed duct system. The supply air is pulled over the water surface at a rate not to exceed 30 fpm so that contaminated air is moved toward a low exhaust point, in this case the source capture systems. The contaminated air is exhausted directly outdoors.



Figure 1 - Source Capture Types

These low exhaust source capture strategies minimize and prevent the recirculation of chloramines and other airborne pollutants, helping maintain the quality of supply air to the breathing zone in the pool and deck area. The absence of chloramines and corrosive pollutants also helps protect natatorium equipment and other HVAC system components.



Low exhaust energy recovery

A properly designed dehumidification system should not recirculate the air being removed from the low exhaust system; otherwise the system would reintroduce the highly concentrated chemicals back into the space. A perceived negative for this is that this exhaust has a significant energy content that is bypassing the recovery capability of the dehumidifier. To minimize this loss, an air to water heat pump recovery system should be installed in place of a basic low exhaust air blower. By using a high coefficient of performance (COP) heat pump, the system can recover from the low exhaust up to 75% of the heating loss of the pool water.

Desert Aire's RecoverAire™ system has been designed to meet the challenges of the low exhaust system and interfaces directly with the SelectAire™ dehumidification system to allow easy field set-up and balancing. Exhausting too much air is an energy waste, but since every application is different the SelectAire™/RecoverAire™ tandem provides the end user with the control to optimize the volume of air in all 5 modes of operation. This capability balances the volume of outside air and exhaust air to ensure proper IAQ and building pressurization while minimizing the cost of operation.

The RecoverAire™ system utilizes an EC fan to control the volume of low source capture exhaust air as directed either from the SelectAire™ dehumidifier's controller or from its own controller if it is interfacing with other styles of dehumidifiers. The controller accepts a signal from the fan to provide a direct read-out of air volume (cu. ft / min) for easy set-up and control.

Tons	Min	Max	THR MBH
02	550	3,190	33
03	800	3,390	51
04	1,100	3,770	74
05	1,400	3,770	88
06	1,900	5,550	113
08	2,080	5,550	123
10	2,500	6,870	162
12	3,400	7,230	205

Figure 2 - Unit Airflow Range and performance at EAT 82°F/60% and 82°F EWT

The system also has a patent pending refrigeration design that optimizes the amount of energy recovery by controlling the evaporator air volume based on refrigeration superheat levels. The combination of the unique refrigeration circuit and the EC fan provides excellent COP values to make this exhaust air system unique for the aquatics industry. Payback is generally between 2 and 5 years depending on local utility rates.

The RecoverAire™ system has a rugged construction using plastic fan wheels, galvaneal panels with powder coat paint and ElectroFin coated evaporator coils. This provides protection against the harsh exhaust air conditions to provide long-life.



Figure 4 - Internal View of RecoverAire™ System

LOW EXHAUST SYSTEM

for more information: www.desert-aire.com

