

DEDICATED OUTDOOR AIR SYSTEMS

**DOAS and HOAS Equipment
for 100% Outdoor Air and
Mixed Air Applications**



Office Environments



Hotels and Motels



Educational Environments



Restaurants



Medical Facilities



Desert Aire's TotalAire™ Series dehumidifiers provide you the most complete solution for your dedicated outdoor air system (DOAS) and high outside air system (HOAS) applications. Our many options allow you to design the highest energy saving solution for your compliance to ASHRAE 62.1 code ventilation requirements for new construction and renovation projects. This system allows the engineer to separate the latent load of the building and deliver conditioned air to the space which will optimize the performance of the buildings convention heating and cooling systems. Rely on Desert Aire for a solution for your complete outside air needs.

OPTIMIZING SOLUTIONS THROUGH SUPERIOR DEHUMIDIFICATION TECHNOLOGY



ISSUES OF INDOOR AIR QUALITY (IAQ)

Several HVAC trade and professional organizations, including ASHRAE, have documented the need for suitable indoor air quality. A primary requirement for maintaining proper IAQ is through the introduction of varying amounts of outdoor air. The down side of adding outdoor air is that it also admits excess moisture into the facility. If this condition is not controlled, it can create an environment for mold, mildew, viruses and other potentially hazardous organisms to flourish. The key to preventing mold formation and growth is to control the relative humidity within the space. A standard air conditioner cannot achieve this since it controls only temperature. Instead, a system must be implemented that can provide full control of both temperature and relative humidity.



Figure 1 - Basic Refrigeration Circuit Diagram

DEHUMIDIFICATION

All TotalAire™ units are designed around a reliable, efficient dehumidification system. There are two main reasons for using the dehumidifier as a base to build a complete ventilation system:

- Significant additional energy costs will result if the latent cooling provided by a standard air handler is used for dehumidification. In contrast, dehumidifiers are the **only** efficient means to regulate moisture removal.
- TotalAire™ dehumidifiers are configured for the easy addition of optional components needed for a complete solution, options that offer effective solutions that are not otherwise available.

TotalAire™ units are engineered and manufactured for excellent performance, dependability and serviceability. Specially designed evaporator coils provide maximum moisture removal. Components are carefully selected for reliable long-term operation.

DEDICATED OUTDOOR AIR SYSTEMS (DOAS)

The most energy efficient method to remove moisture is through the use of a dedicated outdoor air system that lowers the dew point temperature of supply air to below 55° F. This also helps remove existing moisture from inside a facility. A DOAS design can also be optimized to remove maximum moisture at the lowest electrical consumption rate (Moisture Removal Efficiency, MRE) at both full and part-load conditions. Desert Aire manufactures DOAS units under our Aura™, TotalAire™ and VerticalAire™ product lines.

HIGH OUTDOOR AIR SYSTEMS (HOAS)

If the application requires an air handler to accept outside air volumes of 50% to 100% of the supply air volume, conventional sensible heating and cooling units cannot be used. The system must be designed to remove the outdoor air's moisture, but also incorporate a specialized sequence of operation to provide the appropriate sensible cooling and heating. A HOAS design can also be optimized to remove maximum moisture at the lowest electrical consumption rate (Moisture Removal Efficiency, MRE) during both full and part-load conditions. Desert Aire manufactures HOAS units under our Aura™, TotalAire™ and VerticalAire™ product lines..

DESIGN OPTIONS

Desert Aire's TotalAire™ Series offers the widest range of performance options while maintaining its main focus: Meeting the target dewpoint while attaining the lowest operational cost. In addition, the many options help to reduce the operating cost of the remainder of the building's sensible cooling and heating systems. The design engineer has the ability to configure the system with the following configuration options.

- **DOAS or HOAS** - System is flexible in the amount of outside air delivered
- **Energy Recovery** - An enthalpy wheel can recover energy from the exhaust air stream
- **Control Strategy** - Multiple choices allows better energy efficiency
- **Choice of Condensers** - Air, water or geothermal (or combinations)
- **Auxiliary Heating** - Many options including:
 - Gas
 - Electric
 - Hot water or Steam Coils
 - Geothermal
- **Miscellaneous Options** - Indoor/Outdoor systems, fan discharge direction, coated coils and better filtration are just a few of the many additional configuration options available for inclusion on the TotalAire™ Series.

CONDENSER DESIGN OPTIONS

Each unit includes a hot gas reheat coil that is integrated into the refrigeration circuit along with a modulating control system to maintain the discharge temperature based upon the choice of control algorithm. This coil reheats the leaving air to the precise temperature required and rejects any remaining energy to a second condenser.

A choice of secondary condenser options allows the design engineer to integrate the superior design features of the TotalAire™ system into any building type or location. The condensing system is selected to work in series with the hot gas reheat coil to implement the control option of choice. You may choose either an air-cooled condenser, that dissipates heat to the outdoors, or a water-cooled heat exchanger, which releases heat into a facility's chilled water or cooling tower loop.

Air-cooled condensers may be packaged with the dehumidifier on a single skid in an outdoor application. A split system allows the dehumidifier to

be located away from the condenser, indoors or outdoors. Desert Aire only requires two refrigeration pipes (suction and liquid lines) to be run between the dehumidifier and remote condenser.

An optional water-cooled condenser can also be selected for use in loop systems, hybrid systems or in geothermal applications.

AIR SEPARATED COILS

If a hot gas reheat coil is installed too close to the evaporator coil, re-hydration can occur. Water on the surface of the evaporator coil can be blown onto the hot gas reheat coil. This will convert it back into vapor which will then be returned to the space. This completely negates all dehumidification efforts and fails to meet basic IAQ design requirements. Consequently, the system will remove less moisture at a higher electrical cost. That's the reason we design our IAQ units with adequate separation between the outlet face of the evaporator coil and the inlet face of the hot gas reheat coil to prevent re-hydration.



Figure 2 - Water Condenser



Figure 3 - Packaged System

For more information visit www.desert-aire.com



CABINET AND CONSTRUCTION

The TotalAire™ Series features a double wall construction cabinet with a powder coated galvanized steel outer wall and a sturdy galvanized inner panel. Hinged access doors shall allow easy access to internal components within each section. Each door shall have a minimum of two cam latches. Weatherproof compression gaskets shall seal between the door and unit casing to produce an airtight seal. The unit is designed for complete access for service and maintenance from one side only.

Outdoor cabinets include a rain hood and isolation dampers with actuator and have a fully weatherproof roof with a cross broken roof for water drainage.

FILTRATION

Outdoor air contains many airborne particles and pollutants. Filtration is essential to prevent dirt from accumulating on coils and contaminating indoor spaces. When 1-inch or 2-inch wide filters are used, they must be frequently replaced. Therefore, our IAQ units are equipped with a minimum of 4-inch, MERV 8, pleated filters to reduce filter maintenance. Optional prefilters and higher efficiency MERV 13 filters are available as an option.

COIL COATINGS

Sea coast coil coatings are available. Desert Aire uses ElectroFin™ coil coatings to provide long life in corrosive environments.



Figure 4 - TotalAire™ Filter Rack With MERV 13 Filters Installed.

BUILDING MANAGEMENT INTEGRATION

The unit's controller has the following BMS choices:

- LonWorks® compatible.
- BACnet™ MSTP compatible.
- BACnet™ Ethernet compatible.
- Modbus® compatible.

COMPLETE SOLUTIONS FOR 100% OUTDOOR AIR

Solving the 100% outdoor air problem is easy with a TotalAire™ dehumidifier and the expertise of a Desert Aire representative. Complete solutions addressing moisture, cooling and heating loads while recovering and saving energy will help ensure proper indoor air quality and comfort. Contact Desert Aire for assistance when you need complete solutions for conditioning ventilation air.



Figure 5 - TotalAire™ Electrical Panel Detail

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N120 W18485 Freistadt Road, Germantown, WI 53022 sales@desert-aire.com

Ph: (262) 946-7400 - www.desert-aire.com

