

**SUPERIOR SOLUTIONS FOR GROW ROOMS**

# Dehumidifiers for Indoor Grow Room Applications



Cannabis



Lettuce



Strawberries



Alfalfa



Desert Aire's GreenAire™ Dehumidification Systems offers you complete indoor climate control and superior, energy-efficient equipment designs for very large indoor agricultural grow facilities of greater than 150,000 sq. ft. In these extra-large facilities, the use of a chiller is a more economical solution with a simpler installation than running individual refrigeration loops to the condensers.

The GreenAire™ product is a custom air handler that incorporates internal water flow and temperature control loops to allow the system to vary its sensible heat ratio to meet any load in the grow facility. The key design element is the use of Desert Aire's special VPDsync™ control algorithms developed for our direct expansion refrigeration base GrowAire™ product line. The system will find an air and water flowrate along with a water temperature to match the zone's load.

GreenAire™ is designed for a variable speed primary pump system in a chiller loop.



## EXCLUSIVE DESIGN ELEMENTS

### COMPONENTS

The GreenAire™ system will use EC type fans such that the airflows will be self-balancing using the controllers output to set the variable air volume to the correct speed. A remote start-up can be accomplished utilizing AireGuard™ and the many sensors and transducers.

The system features a double-wall indoor/outdoor cabinet with a vertical airflow configuration, with multiple discharge locations. The unit is designed for use in the interstitial space. The height will be limited and the sizes will change the width of the system.

### PERFORMANCE

The cooling capacity and dehumidification capacity cover a wide range due to the system's design flexibility, but one of the key drivers is the chilled water loop temperature. The colder the loop temperature, the higher the dehumidification capacity will be of the system. The second is the entering air conditions. The closer to saturation, the greater the dehumidification capacity.

With the GreenAire™ system's ability to vary the water temperature to the chilled water coil, the flow rate of water to the coil, and the airflow rate across the coil, the system can vary the sensible heat ratio across a wide range to meet the variable demands of the grow facility. During equipment selection, the target conditions and the loads are reviewed to determine the unit operating parameters and the capacity. The goal is to maintain

target humidity in the indoor plant environment while reducing or eliminating the need for humidifiers and lowering energy use of the system.

The hot water coil has been designed with the lower water temperatures of heat recovery chillers in mind. The capacity of the coil will be sufficient to provide reheat to the air stream when more dehumidification is required so the system does not over-cool the zone. In addition, the system can provide extra heat in the lights off mode to compensate for any building heat loss.

The system will provide the following functions for an indoor grow facility:

- Dehumidification
- Cooling
- Heating (hot water)
- Internal pump and flow control valves
- AireGuard™ start-up, monitoring and alerts
- CO<sub>2</sub> option
- Enhanced air filtration option

For facilities that require site generated power because the local utility does not have capacity or the location is too far from a distribution hub, the use of combined power becomes the only option. Since hot and cold water are by-products of the electrical generation, the GreenAire™ air handler becomes a solution for these growers.

GreenAire™ specifications and cabinet sizes are below. Values and specifications are preliminary. Performance is for estimate only. Consult factory for unit application specific details.

Vertical Cabinet Configuration					
Series		GRAV	GRBV	GRCV	GRDV
Maximum Airflow (SFM)		2,500	5,000	7,500	10,000
Required Chilled Water Flowrate (GPM)		20	32	44	60
Total Cooling Range (MBH)	45°F (7°C)	85 to 160	105 to 185	140 to 235	185 to 325
Dehumidification Range (lb/hr)	EWT	5 to 55	5 to 80	5 to 95	5 to 130
Total Cooling Range (MBH)	25°F (-4°C)	115 to 175	205 to 300	270 to 385	345 to 485
Dehumidification Range (lb/hr)	EWT	25 to 85	40 to 145	50 to 180	50 to 225
Entering Chilled Water Temp °F (°C)	15°F to 50°F (-9°C to 10°C)				
Entering Hot Water Temp °F (°C)	110°F to 180°F (43°C to 82°C)				
Cabinet Size (in)					
Height		79	79	79	79
Width		65	70	78	90
Depth		46	46	46	46
Notes:					
• 30% Propylene Glycol for EWT below 35°F (2°C)					
• Higher Capacity is at 80°F (27°C)/70% RH Entering Air at Maximum Airflow					
• Lower Capacity is at 72°F (22°C)/45% RH Entering Air at Maximum Airflow					

## FEATURES AND BENEFITS

Feature	Benefit
Integrated Temperature and Humidity Control	Desert Aire controls both the cooling and dehumidification needs in the grow room to eliminate the need to add independent dehumidifiers.
VPDsync™	VPDsync™ environmental control operates on four dimensions of control to perfectly match the loads in an indoor plant environment. The controls in a GreenAire™ unit with VPDsync™ command the water temperature, air flow and water flow to provide full modulation of the system. This provides the optimal temperature from the system at all times to maintain both temperature and humidity.
Desert Aire Questionnaire	Allows Desert Aire to identify ideal equipment configuration and sizes to meet each cultivator's needs. Eliminates the guesswork in determining how much moisture removal you need.
Optimal Air Volume	Air flow is adjusted in response to the dehumidification and cooling requirements. In addition to tight control, this provides fan energy savings.
Microprocessor Operating Control	GreenAire™ units include factory provided operating controls that will adjust water temperature and flow, adjust airflow, activate CO <sub>2</sub> injection (option), and record alarm history. There's no need to rely on others to determine when and how to activate cooling or dehumidification.
AireGuard™ – Cloud-Based Access	GreenAire™ installations include remote access. This secure system allows approved users to access the system through the internet. Alarm notification via SMS and email are included. With AireGuard™, customers also receive industry best technical support. Our ability to see controller inputs and outputs and view data trend graphs allows us to provide valuable input for equipment tuning and diagnostics.
Hot Water Coil	A Hot Water Coil allows a unit to warm the air to the proper temperature after moisture removal. The leaving air temperature is precisely controlled to prevent wild swings of the zone temperature.
Year Round Operation	GreenAire™ systems can use glycol solutions to allow operation in extreme climates.
Adjustable Control Parameters	Every grow room is slightly different. Once plants are put into a room, control algorithms can be tuned by our tech support team to provide tight control of the room VPD (Vapor Pressure Deficit), temperature and humidity to improve plant growth.
Desert Aire Zone Sensors or Network Sharing of Zone Conditions	Our operating controller will accept Network sharing of the Zone Temp and Humidity if you wish to use your fertigation sensors as the main sensor. Desert Aire would use its sensors as a backup in the event that network communication fails.
Unit Filtration	GreenAire™ units include 4 inch pleated filters at the intake. Our filters are available in any commercially available MERV rating in a 4 inch size.
BACnet, Modbus, and LonWorks Communication Protocols	Multiple options for connecting GreenAire™ units to your automation system.
Redundancy (N+1)	When GreenAire™ is used with a modular heat recovery chiller such as Multistack, the cultivator will have overall system redundancy to eliminate the potential risk of losing all of the chilled water supply on a compressor failure. The question that should be asked is "what happens to my crop if I lose 1 or 2 modules?" Think of it as N-1 or N-2 philosophy.

**For more information visit [www.desert-aire.com](http://www.desert-aire.com)**



## PRELIMINARY PRODUCT SPECIFICATION

### Cabinet

- Indoor/outdoor
- Painted cabinet
- 2" double wall
- Hinged service doors

### Features

- Chilled water coil
- Hot water coil
- ElectroFin® coating standard

### Blowers

- Plenum fans
- EC direct drive

### Controllers

- Carel controller

### Integral Auxiliary Heat

- Hot water coil

### Filters

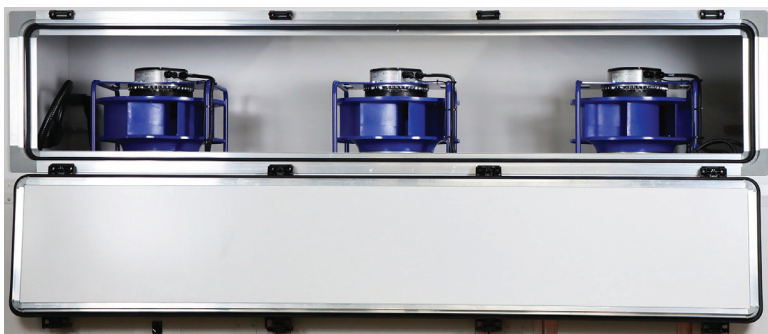
- MERV 13 filters

### Misc. Options

- Field installed disconnects
- CO<sub>2</sub> control
- Advance filtration



GreenAire™ with top discharge configuration shown.



Access to EC fans through a full-width door.



GreenAire™ hinged service doors open from either side and are removable.

## OPTIMIZING SOLUTIONS THROUGH SUPERIOR DEHUMIDIFICATION TECHNOLOGY

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 **WARNING:** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)