Desert Aire’s GrowAire™ Dehumidification Systems offer you complete indoor climate control and superior, energy-efficient equipment designs. These systems empower you to optimize the growth rate and desired qualities of crops, meeting your need for daily control of humidity, temperature and airflow as lights are cycled on and off, water and nutrients are delivered to plants, and as crops develop over time.

Our GrowAire™ configurations feature scalable designs. This allows you to size the systems for peak cooling loads when plants are small and not transpiring much water – then regulate humidity levels as plants mature and release significant volumes of water vapor into growing spaces. GrowAire™ system flexibility allows you to conserve energy and other resources for significant operational savings while addressing all critical indoor climate control issues; and meeting code ventilation requirements.

Whether your application is new construction or a renovation project; and equipment must be located indoors, outdoors or on a rooftop; Desert Aire is your source for an expert solution to indoor climate control needs.
ATTAINING THE PERFECT INDOOR CLIMATE

Industrial cultivation and indoor farming facilities create very unique and difficult challenges to the design of HVAC systems. These facilities have diverse, intense requirements for humidity, temperature and airflow control that change as plants develop, and according to the types of crops being grown. Attaining the perfect indoor climate for your operations requires an HVAC equipment manufacturer that routinely provides environmental control solutions to meet these requirements, not a vendor that just provides conventional air conditioners and dehumidifiers.

An integral part of the overall design is the modulating hot gas reheat system. This system employs a custom proportional, integral and derivative (PID) control algorithm to adjust actual leaving air temperature, using a zone temperature sensor to create a feedback loop. This allows the system to achieve the exact amount of zone cooling required independently of the demand for dehumidification.

For an air-cooled model, the GrowAire™ system has special elements to allow it to continue to operate in cold climates year round. The system includes larger receivers and a patent-pending set of refrigeration valves that prevent the system from turning off when cold outside temperatures create low head pressure in its compressors. The safeties of conventional air conditioners and dehumidifiers would trip off, responding to low pressure alarms.

The exclusive design elements of our systems and custom controls create the ability to vary sensible heat ratios. Our unique designs provide for GrowAire systems to be sized for peak cooling loads when plants are very small and not transpiring much water vapor; then transition to meet moisture loads when plants become larger and release significant volumes of water vapor into spaces.

ADDRESSING INDOOR AIR QUALITY & EVAPOTRANSPIRATION ISSUES

Managing the issues of indoor air quality (IAQ) and evapotranspiration are key to the success of indoor farming operations. If these issues are not controlled, mold, mildew and potentially hazardous organisms can flourish. The key to preventing the formation and growth of biological contaminants is to control the absolute humidity within the space. A standard air conditioner cannot achieve this because it controls only temperature. Some systems that claim to also control humidity with only partial condenser reheat capability do not perform well over the entire grow season experienced in this type of application. Overall, a system must be designed and implemented that responds to and controls space conditions efficiently, and maintains a strategic airflow rate across the plant canopy.

Desert Aire dehumidification systems feature an advanced refrigeration design that can vary sensible heat ratios and adjust room temperatures independently of space dehumidification needs. The evaporator uses deeper coils with enhanced tubing and fin characteristics than traditional air conditioning systems, delivering higher latent heat removal. This also allows the system to remove more moisture per nominal ton. The design uses an electronic expansion valve (EXV) to maintain the optimum level of superheat while maximizing total cooling capacity over a very wide range of return air conditions. In grow rooms the difference is significant when considering lights on versus lights off modes. In addition the system features staged compressors to balance the mass flow differences to respond to a wide range of return air conditions, without having to use hot gas bypass to protect the evaporator coil from freezing. Single compressor systems must function over a much narrower return air range.
**GROWAIRE™ APPLICATION CONFIGURATIONS**

Desert Aire’s GrowAire™ product line is configurable to meet your specific indoor farming needs. The units range in size from 1 to 60 nominal tons to serve a wide variety of indoor growing spaces. GrowAire™ systems can be designed to meet your exact growing conditions from 65°F to 85°F at 45% to 75% RH. Provide Desert Aire with your cultivation plans and let us select a GrowAire™ dehumidification system to meet your needs.

**DESIGN OPTIONS**

Desert Aire’s GrowAire™ series offers the widest range of performance options that maintain the main focus of dehumidification-based systems: Meeting the target dew point while attaining the lowest operational cost. These options also help to reduce the operating cost of the remainder of the facility’s sensible cooling and heating systems. The design engineer has the ability to customize GrowAire™ systems with the following configuration options.

**Choice of Condensers** – Air-cooled; water-cooled; geothermal; or combinations.

**Auxiliary Heating** – Many options including natural gas; electric; hot water or steam coils; and geothermal.

**Miscellaneous Options** – Indoor/outdoor systems, fan discharge direction, coated coils and enhanced filtration are just a few of the additional configuration options available with GrowAire™ systems.

**CONDENSER DESIGN OPTIONS**

Each GrowAire™ dehumidification system includes a hot gas reheat coil that is integrated into the patent-pending refrigeration circuit along with a modulating control system to maintain the discharge temperature. 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 features of the GrowAire™ system into any grow room 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 condenser that 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 for 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) per circuit 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 transferred to the hot gas reheat coil. This will convert water back into vapor that is then 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 energy cost. Preventing re-hydration is the reason we design our GrowAire™ systems with adequate separation between the outlet face of the evaporator coil and the inlet face of the hot gas reheat coil.

**CABINET AND CONSTRUCTION**

Desert Aire designs and manufactures GrowAire™ Series cabinets and enclosures to provide secure, long term protection from weather and corrosive elements while providing service personnel with easy access to equipment interiors. Details on individual GrowAire™ Series units are listed below.

**Aura™ Series**
The Aura™ Series features a double wall construction cabinet with a powder coated galvanneal steel outer wall and a sturdy galvanized inner panel. Hinged access doors allow easy access to internal components within each section. Each door has an adjustable cam operated latch and weatherproof compression gaskets between the door and unit casing to produce an airtight seal. The outdoor cabinet includes a rain hood and outside air dampers with actuator. The system eliminates standing roof seams by using a fully weatherproof membrane roof that is sloped to the non-service side for water drainage. The roofing membrane is a thick laminate that is UV resistant and performance verified by UL to the UL 790 standard. The system also uses an easily serviced plenum fan that provides uniform air distribution across the gas or electric heating elements.

**TotalAire™ Series**
The TotalAire™ Series features a double wall construction cabinet with a powder coated galvanneal steel outer wall and a sturdy galvanized inner panel. Hinged access doors allow easy access to internal components within each section. Each door has a minimum of two cam latches. Weatherproof compression gaskets between the door and unit casings 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.

**VerticalAire™ Series**
The VerticalAire™ Series features a double walled steel construction cabinet design with galvanized outer and inner panels for the 20 to 30 ton systems. Our smaller VerticalAire™ systems are normally installed in or in close proximity to the room being conditioned, so these systems have their compressors in a separate insulated section that avoids spreading noise by using closed cell foam, with mold resistant characteristics, as the inner liner.
**Filtration**

Grow room air contains many airborne particles and pollutants. Filtration is essential to prevent dirt from accumulating on coils and the contamination of indoor cultivation 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.

**GrowAire™ Technology Provides Precision, Flexibility**

The proper selection and sizing of an indoor climate and dehumidification system for an indoor farming process requires careful planning and a thorough understanding of the operating conditions that must be maintained. Desert Aire has deep and broad experience at evaluating the factors and variables involved in reconciling indoor climate needs, and developing complete solutions that save energy while supporting favorable outcomes for people, processes and enterprises.

You invest too much in your operations to get poor yields or lose your crops due to improper temperature and humidity control. A Desert Aire GrowAire™ system ensures that your crops thrive under the very best conditions.

Contact Desert Aire today for a free evaluation of your indoor climate and dehumidification needs.

**Coil Coatings**

Desert Aire offers ElectroFin™ coil coatings for its air-cooled condensers to provide long life in corrosive environments including coastal locations.

**Building Management Integration**

To integrate your GrowAire™ system with building management networks, Desert Aire offers the following control choices.

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

For larger grow rooms where multiple units are required, communication between units is across a simple two-wire network. This ensures the system and units solve the same control issue and do not fight each other; and provides higher levels of control.

**Setting the Standard for Dehumidification**

At Desert Aire, we have a genuine desire to solve indoor air quality problems so that people can live, work and play in clean, healthy and dry environments.

As a recognized leader in the design and manufacture of dehumidification and dedicated outdoor air systems, we utilize advanced technology to successfully address humidity and air quality concerns. We have a reputation for delivering high-quality systems that are durable, reliable and offer significant energy savings. Our customer-focused philosophy means we are committed to providing attentive, excellent service and support that meets customer needs and helps customers become more successful.