

# Dehumidifiers for Indoor Pools, Commercial, Industrial and Residential Applications



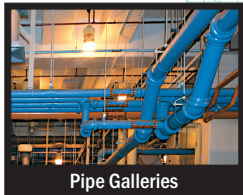
Residential Pools



Commercial Pools



Libraries



Pipe Galleries



Manufacturing Facilities



Indoor pools for hotels, resorts, healthcare, and residential applications along with applications to remove unnecessary moisture in industrial, commercial, public works, and municipal projects are the types of facilities that benefit from the use of our ExpertAire™ dehumidifiers. ExpertAire™ is an enduring product line for Desert Aire that represents the culmination of our core expertise in dehumidification.

The ability of these units to be applied to diverse applications combined with their flexibility to appropriately regulate the introduction of outdoor air to a facility makes them a true energy efficient workhorse that consistently performs time and again.

## MOISTURE REMOVAL CAPACITY

The Air-Conditioning, Heating and Refrigeration Institute (AHRI) created Standard 910 as an industry-wide standard for manufacturers, engineers, installers, contractors and end users. The purpose of this standard was to establish, for indoor pool dehumidifiers: definitions; classifications; requirements for testing and rating; minimum data requirements for published ratings; operating requirements; marking and nameplate data; and conformance conditions.

Standard 910 has created new provisions to measure the capacity and effectiveness of pool dehumidifiers. For example, the standard defines Moisture Removal Capacity (MRC) as the amount of condensate a unit produces, as impacted by coils, circulating fans and other components in the air stream, excluding supplementary heating, cooling or outdoor air, and is expressed in lb/h (kg/h). Also, it defines Moisture Removal Efficiency (MRE) as a ratio of the MRC divided by the unit's power input at any given set of rating conditions, and is expressed in lbs of moisture/kWh (kgs of moisture/kWh).

## EXPERTAIRE™ DESIGN

Desert Aire's ExpertAire™ Series dehumidifiers have been designed with this standard in mind. We've used the latest coil design technology to increase evaporator and condenser capacity while simultaneously reducing their pressure drop. This combination yields the highest MRE available.

Desert Aire has also submitted the ExpertAire™ Series to an independent testing laboratory for positive verification of its MRCs and MREs. Desert Aire ExpertAire™ dehumidifiers are rated in accordance with the AHRI 910-2014.

## FEATURES

Many applications need the removal of unwanted moisture. If unchecked, this moisture causes condensation on walls, windows and floors. This can create problems with a building's structural integrity and consequently endanger customers and employees.

In manufacturing, a humid environment can also contribute to lowered productivity by damaging product or increasing cycle times.

Desert Aire's ExpertAire™ Series products are designed for applications with air temperatures between 65° and 95°F (18° and 35°C) that require moisture removal between 4 and 100 lbs (2 and 45 kg) per hour. An ExpertAire™ dehumidifier optimizes moisture removal by using a specially designed coil to maximize the system's latent capability, thus yielding 3 to 4 times the moisture removal capacity over a standard air conditioning system. Each system also includes a hot gas reheat coil that is sized for 100% rejection of the recovered energy. This coil allows the unit to continue to dehumidify without over-cooling the space.

These systems also feature an optional capacity control design which protects the coil from freezing during low temperature/low load operation. In addition, the system helps to eliminate high load nuisance service trips by re-balancing the refrigerant system. ExpertAire™ models are fully protected with IEC starters, overloads and refrigerant switches.

ExpertAire™ dehumidifiers feature scroll compressors for high efficiency and long life. Other components are also designed for longevity such as our cabinet which is manufactured from galvalume with a high impact, powder coat textured paint finish.

A distinct feature of these dehumidifiers is that they can be equipped with an outdoor air intake connection to help meet ASHRAE 62 standards. Outdoor air is introduced after the evaporator coil but prior to the reheat condenser to guarantee moisture removal capacities. In addition, the units are equipped with an evaporator bypass damper. This feature automatically adjusts the evaporator air volume to maintain proper air distribution over the coil in all modes of operation.

Our ExpertAire™ dehumidifiers also offer a control that enables the unit to completely close the outdoor air damper when a facility is in an unoccupied mode. Because no outdoor air is being introduced for ventilation, this feature eliminates the need to further condition the outdoor air (heating, dehumidification or cooling) which in return, helps save energy.

## EXPERTAIRE™ PACKAGED SERIES (LCQ - AIR COOLED/ PACKAGED)

The ExpertAire™ Packaged Series features a double wall cabinet construction with a powder coated galvalume steel outer wall and a sturdy galvanized inner panel. Hinged access doors allow easy access to internal components. Each door has an adjustable cam operated latch and weatherproof compression gaskets between the door and unit casing to produce an airtight seal. This 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 secondary 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 auxiliary gas or electric heating elements.

## EXPERTAIRE™ (LC AND LV) SERIES

The ExpertAire™ LC and LV models feature panels constructed of sturdy galvalume steel (18-gauge for LC units and 20-gauge for LV units) coated with high-yield polyester powder-coat paint. Removable side panels provide easy access to all serviceable elements.

## REFRIGERATION CONFIGURATIONS

ExpertAire™ is available in one of the following four configurations.

### 1. REHEAT ONLY: —————

Standard design that removes moisture from the air at the evaporator coil and reheats the dehumidified air before returning it to the space.

### 2. REHEAT & REMOTE CONDENSER\* READY: —————

This option allows the dehumidification process to continue when cooling is required in the zone being conditioned.

### 3. REHEAT & WATER: —————

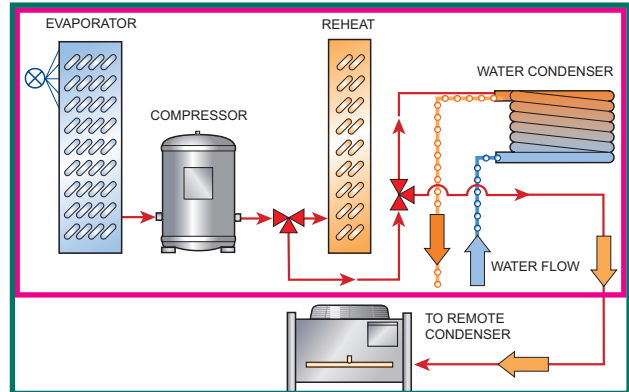
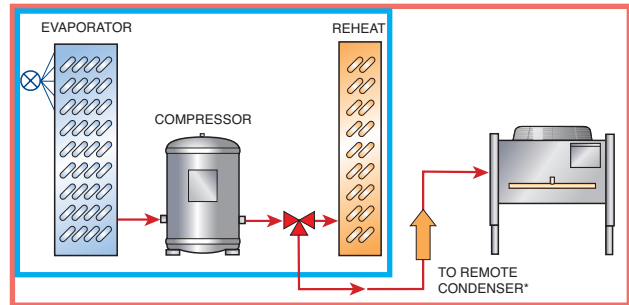
In addition to the reheat coil, a water condensing coil is added to the circuit. Either circuit can become the primary heat sink allowing the circuit's latent and sensible energy to be directed to a water source or returned to the air.

### 4. REHEAT & WATER & REMOTE CONDENSER\*\* READY: —————

This is a combination of all heat sink options available. This option is chosen when pool water heating and air condition are all required. All heat sinks are sized to reject 100% of the recovered energy.

\*LCQ pool units include packaged air-cooled/package condenser.

\*\*Partial pool water condenser is available.



## AIREGUARD™

AireGuard™ is Desert Aire's remote monitoring and alarming tool that allows a user to easily monitor the performance of the dehumidifier on a cloud-based database at any computer or portable device. All that is required is an Ethernet Internet connection directly to the Desert Aire operating controller.

Information security is maintained since this is a cloud based system where the client computer only accesses the remote data servers. The unit controller transmits data to and from the cloud storage location. Communication at the controller takes place on port 80, the same port that any computer uses to communicate with the web. The existing LAN firewall is maintained and no action from the IT department is required as long as the facility has internet access. Users log onto the cloud-based service to view and interact with data, no further access to your local network is required. This connection will meet all of your IT department's security requirements. LC, LV, and LCQ Series products have an onboard Ethernet connection as standard.

The AireGuard™ interface easily brings the read and write variables in real time to the display screen. It allows the user to adjust set-points remotely as well as monitor all the operating variables. The LC/LV/LCQ Series have another feature that allows the local display interface to be duplicated on the cloud based interface. This feature allows for remote startup capabilities by Desert Aire employees.

Since the refrigeration system of a dehumidifier is very complex, many



owners hire outside firms to maintain their units. The alarm management feature of AireGuard™ provides the owner with email or SMS notifications at time of occurrence. With appropriate access to the unit via the cloud, the servicing contractor or Desert Aire may be able to evaluate the unit's alarm with corrective action without visiting the site.

AireGuard™ is included with each LC/LV/LCQ unit and includes a two year subscription to the cloud data storage. Renewal subscriptions can be purchased after expiration.

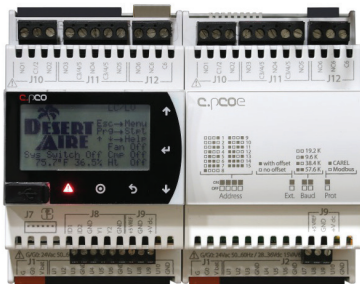
For more information visit [www.desert-aire.com](http://www.desert-aire.com)



## EXPERTAIRE™ SERIES

### STANDARD FEATURES

- 4-inch MERV 8 return air filters
- R-410a refrigerant
- Refrigeration coils are aluminum fins on copper tube
- Stainless steel, sloped drain pan
- Full sized Hot Gas Reheat Coil with separation from Evaporator Coil
- Refrigerant pressure transducers with display on controller
- DDC operating control with Internet ready AireGuard™
- Differential pressure readout for confirmation of airflow
- Superheat and Subcooling calculation displayed on controller
- Binary and analog Aux heat outputs
- Direct drive EC blower assembly (LCQ)
- Automated preformed refrigerant piping in all units



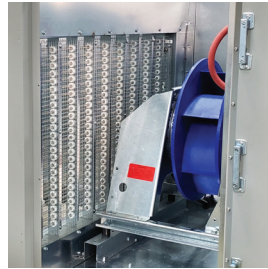
Controller common to all ExpertAire units



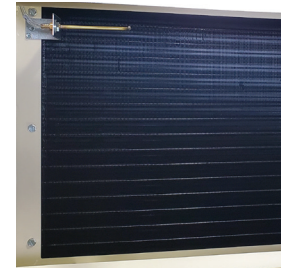
2-inch double wall cabinet on LCQ

### CABINET CONSTRUCTION

- LC cabinet constructed of sturdy 18-gauge galvanized steel panels
- LV cabinet constructed of sturdy 20-gauge galvanized steel panels
- LCQ cabinet constructed of 2-inch double wall with galvanized steel outer wall and a sturdy galvanized inner panel
- Removable side panels (LC and LV)
- Hinged door panels (LCQ)
- All cabinets coated with high-yield polyester, textured, finger print-resistant powder-coat paint that meets:
  - 1000-hour salt spray test
  - 160 in-lb direct impact resistance
  - 1000-hour humidity resistance



Electric heater (LCQ unit shown)



ElectroFin-coated coil

### INSULATION

- LC and LV units include 3/8-inch (indoor) 3/4-inch (outdoor) closed cell foam insulation\*
- LCQ units include 2-inch polystyrene insulation

\*Insulation meets:

- ASTM mold, mildew, moisture resistance specifications
- NFPA fire specifications
- UL specifications

### AUXILIARY HEAT OPTIONS

- Electric heat (LC, LV and LCQ)
- Hot water coil (LC and LCQ only)
- Indirect fired gas heater (LCQ only)

### ADDITIONAL OPTIONS

- Single or dual point power available on units with electric Aux heat
- ElectroFin® coil coating (recommended for pool applications and any corrosive environment)
- Multiple voltages available in 60Hz (50Hz available by request)
- Unit-mounted power disconnects (fused and non-fused)
- Direct drive EC blower assembly (LC)
- Voltage/phase monitor
- Dirty filter alarm
- Condensate overflow alarm
- GFI and service light options
- Consult factory for other unique options

Supporting literature (PDF files at [www.desert-aire.com](http://www.desert-aire.com)) includes:

- Technical Bulletin 5 - Ventilation Air for Indoor Pools
- Technical Bulletin 7 - Indoor Pool Dehumidification
- Technical Bulletin 8 - Pool Room Design Summary
- Application Note 10 - Swimming Pool Dehumidifier Sizing
- Application Note 11 - Industrial Dehumidifier Sizing
- Application Note 12 - Water Treatment Plant and Pumping Station Dehumidifier Sizing
- A Guide to an Integrated HVAC System Design for the 21st Century Natatorium

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## EXPERT HELP WITH YOUR POOL ROOM

# POOL OVERVIEW

### Dehumidification Protects Your Investment

Don't jeopardize your investment in an indoor pool by allowing excessive moisture to condense on and inside walls, ceilings and floors. Dehumidification controls humidity levels which can contribute to condensation and the growth of mold and mildew.

### Dehumidification Saves Energy Over Conventional Ventilation

Conventional ventilation systems attempt to control pool room humidity by exhausting warm, moist air and bringing in outdoor air. The result is huge annual energy expenses. As dehumidifiers dry the pool room air, they capture heat energy from warm air and the moisture it contains. By carefully choosing where to release energy, dehumidifiers can give you big savings on energy bills.

### Moisture Load Calculations

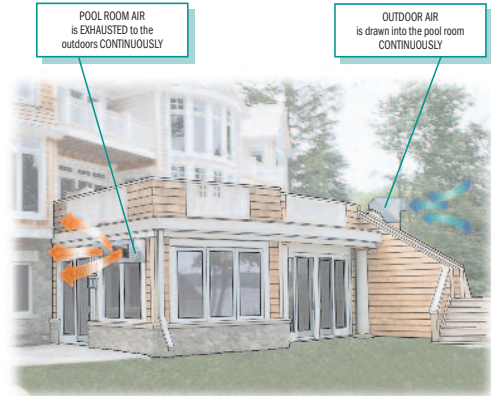
With thousands of successful installations in reliable operation, Desert Aire has the experience to provide the right dehumidification solution for your pool room. The key to proper moisture control is to understand how much moisture will be in the pool room air under various conditions. Desert Aire representatives use advanced software to calculate moisture loads and select the right dehumidifier quickly and accurately. *Application Note 10: Swimming Pool Dehumidifier Sizing* explains the theory behind the calculations.

### HVAC System Design Information

Your contractor is responsible for understanding the heating and cooling loads for a pool room, and the heating requirements for the pool water. You will need to agree on acceptable pool room air and water temperatures. Auxiliary heating and cooling needs beyond what can be supplied by the dehumidifier should be addressed by your contractor.

### Installation and Operation Support

Desert Aire's knowledgeable service personnel, plus a network of factory-trained refrigeration contractors, ensure excellent installation and service support. The most comprehensive warranty in the industry protects our dehumidifiers, remote condensers and controls



#### Conventional Ventilation

##### Cold Outdoor Air

Huge bills for heating outdoor air while previously warmed air is exhausted outdoors.

##### Hot Outdoor Air

Space is overheated when outdoor air is warmer than inside. Creates uncomfortable environment.

##### Humid Outdoor Air

Pool room humidity cannot be controlled.



#### With A Desert Aire Dehumidifier

##### Cold Outdoor Air

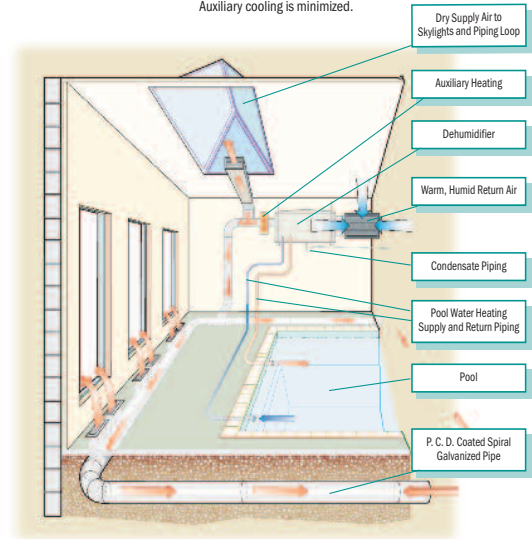
Captured heat is released into recirculating air to minimize auxiliary heating

##### Hot Outdoor Air

Dehumidifier cools by sending captured heat outdoors to remote condenser. Auxiliary cooling is minimized.

##### Humid Outdoor Air

Pool room humidity is carefully controlled.



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## ElectroFin® E-coat Coil Coating

Desert Aire has partnered with Luvata ElectorFin for its coil coating because of its superior performance in preventing corrosion and fin deterioration in the pool and coastal climate applications. ElectroFin® E-coat is a water-based, flexible epoxy polymer coating process engineered specifically for HVAC/R heat transfer coils. ElectroFin® uses a PPG POWERCRON® e-coat formulation specifically designed to provide excellent edge coverage of fins with a unique polymer that controls the flow characteristics of the coating.

Benefits of ElectroFin's factory-applied electrocoating process:

- The only process that can guarantee 100% coil coverage without bridging, including enhanced fin designs
- Excellent corrosion and UV resistance make it suitable for pool room and coastal environments

Electrocoating is the process by which a metallic work piece (coil) is submerged in a paint / water bath where electricity is used to deposit paint onto it.

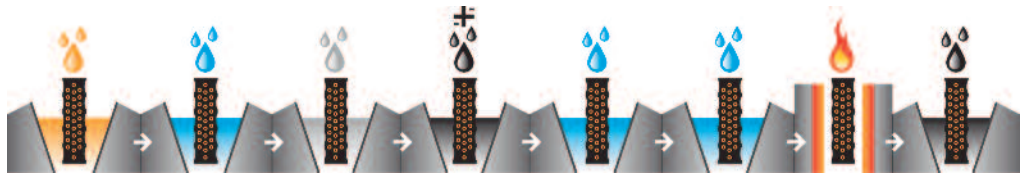


Figure 1 - ElectroFin® E-coat Process

### Corrosion Resistance

In the electrocoating process, the coil assembly acts in the same way as a magnet. The coating molecules are electrically attracted to the metallic coil surfaces, meaning the entire coil is completely and uniformly coated. When we mention the entire coil we are talking about the coil fins, end plates, copper tubing and copper return bends. In other words, the coating covers the entire coil assembly. The result is a finish which provides excellent resistance to pool chemical, coastal marine (salt-air), industrial and urban environments. When properly maintained, you can expect ElectroFin® e-coated coils to provide protection for years. Desert Aire provides a 5-year coil parts warranty as evidence of its superior protection.

### Resistance to UV Degradation

When coils are to be subjected to ultraviolet exposure such as the remote condenser, they receive a spray-applied, UV-resistant urethane mastic topcoat. As a result, UV degradation of the epoxy e-coat polymer molecules is eliminated and the film integrity is maintained. This is offered as an option for our RC Series condensers.

### Proven Effective

The electro-deposition process is the most automatic, controllable, and efficient method for applying a corrosion inhibiting coating to a metallic work piece. The process dictates that all metal surfaces are coated in an even, uniform finish. All coil surfaces reach an average e-coat dry film thickness of 1 mil (0.001"). It meets the 5B rating cross-hatch adhesion per ASTM B3359-93. Corrosion durability is confirmed through testing to no less than 5,000 hours salt spray resistance per ASTM B117-90 using scribed aluminum test coupons.

### Comparison to Fin Stock Coatings

Not all coil coatings are the same. Many dehumidifier companies use a fin stock coating that is applied to the aluminum stock before the coil is manufactured. This means the edges of the fin, the copper tubes and the steel header remain uncoated.

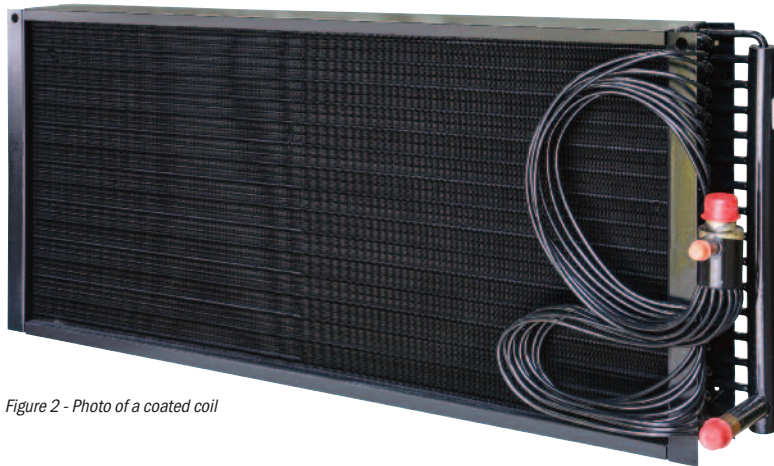


Figure 2 - Photo of a coated coil

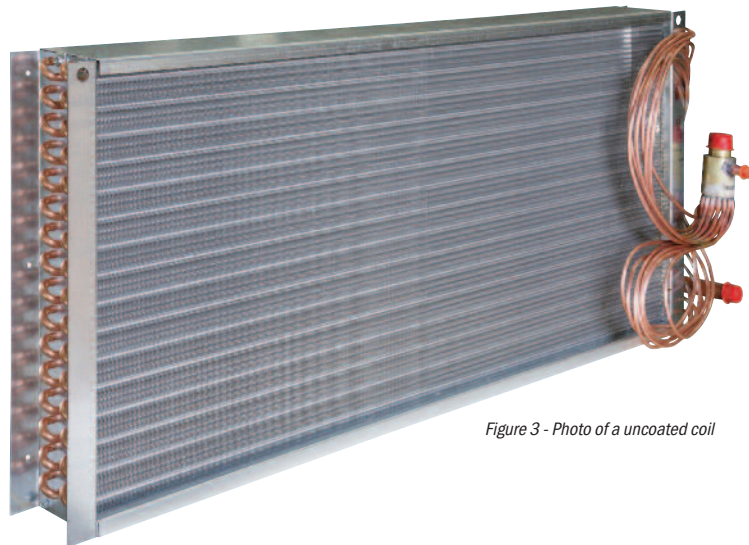


Figure 3 - Photo of a uncoated coil


CORROSION RESISTANT COILS

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## AUXILIARY HOT WATER HEAT - LC AND LCQ PACKAGED UNITS

### OPTIONAL HOT WATER HEATING OPTIONS

Desert Aire provides auxiliary heating options for its ExpertAire™ Series product line that are sized to meet the winter heating requirements of the zone.

Desert Aire sizes the heating elements to precisely match the load requirement of the system. This internal heating coil is a two row coil. The heaters are automatically controlled by the unit's microprocessor to maintain zone temperature. A customer supplied hot water control valve is modulated from the controller with a 0 to 10 VDC direct acting signal. Please refer to figure 1 for a typical installation.

### HWC Design Inputs

The coil is selected for each customer's particular application based on the following criteria:

- **Entering water temperature (EWT), typically between 140°F and 180°F**
- **Leaving water temperature (LWT), typically 20 degrees less than the EWT**
- **MBH capacity desired**
- **Entering air temperature (EAT), winter design for your area**
- **Leaving air temperature (LAT), typically neutral to a maximum of 100°F**
- **GPM flow rate desired**
- **If there are fluid pressure drop restrictions to be aware of.**
- **Type and concentration of glycol used**

For freeze protection Desert Aire uses a capillary type temperature sensor which is attached across the down-stream face of the coil. Freezestat is set at 38°F with an auto reset switch. If engaged the unit controls would respond by closing the outdoor air damper, open the hot water coil valve 100%, and log the alarm on the controller.

To size the control valve, please provide a qualified vendor the water temperature, flow rate (gpm) and the requirement for a 0 to 10VDC signal and they will select the appropriate valve to purchase.

Optional ElectroFin® coil coating is available.

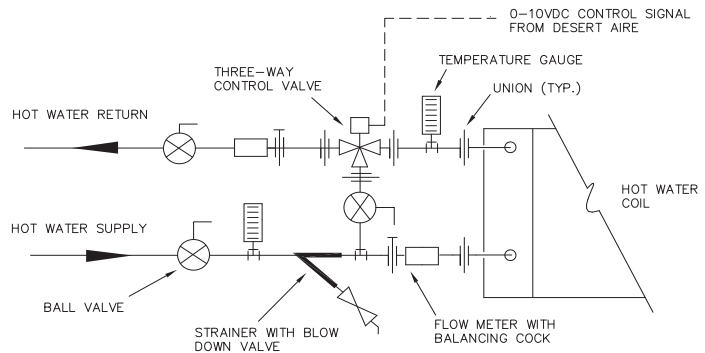


Figure 1 - Hot Water Piping Detail

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### OPTIONAL AUXILIARY ELECTRIC HEATING OPTIONS

Desert Aire provides auxiliary electric heating options for the ExpertAire™ Series that are sized to meet the winter heating requirements of the zone.

Desert Aire sizes the heating elements to precisely match the load requirement of the system. The heaters are automatically controlled by the units microprocessor, using a two stage, time delayed sequence.

#### Design Specifications

The following list highlights the noteworthy features of the ExpertAire™ Series electric heaters:

- System Single Point Power to Dehumidifier
- NiCr 60 Corrosion-Resistant Element
- Welded Construction Using 20 MSG Galvanized Steel
- Automatic Reset High Temperature Limit Safety Switch
- Manual Reset High Maximum Temperature Limit Safety Switch
- Air Flow Pressure Switch
- Fusing as Required for Each 48 Amp Circuit
- Fused Circuits per N.E.C., UL, and CSA

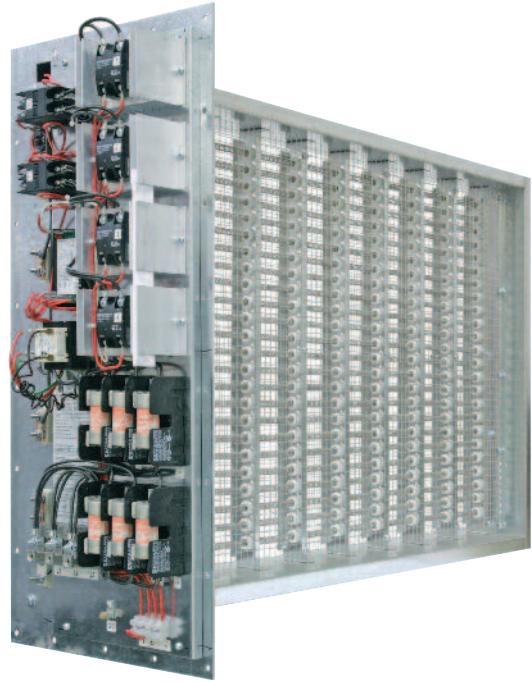


Figure 1 - Detail of Electric Heating Element for LC Series Unit



Figure 2 - Detail of Electric Heating Element for LV Series Unit

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**AUXILIARY GAS HEATING OPTIONS**

Desert Aire provides auxiliary gas heater options for its ExpertAire™ Series product line that are sized to meet the winter specified heating requirements for the space. Natural gas is standard with LP gas is available upon request. These heating elements are utilized when the air temperature in the space drops below the customer set point. The heaters are not allowed to operate when the unit is in the cooling mode.

Desert Aire sizes the heating elements to precisely match the load of the system. This may be in a single heater module or in multiple modules. A modulating gas valve is automatically controlled by the unit's microprocessor to maintain an exact leaving air temperature. If multiple burner sets are utilized, then a vernier sequence is used where the base burner is modulated and the others are staged. The system's overall turn down ratio is a function of the number of heating modules and is summarized in the table below:

Tons	Quantity Heaters	Natural Gas	LP Gas
5 to 10 tons	1	5 to 1	5 to 1
12 to 15 tons	2	10 to 1	10 to 1



Figure 1 - Detail of Gas Heat Compartment on ExpertAire™ LCQ Series Packaged Unit

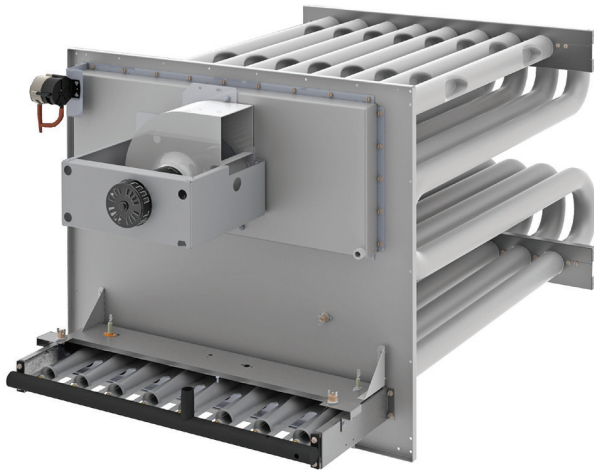


Figure 2 - Detail of Gas Heat Burner Assembly

The gas module shall provide a minimum combustion efficiency of 80%, and listed for operation downstream of refrigeration or cooling system, and provide means for removal of condensate that occurs in the heat exchanger during cooling operation. They are listed for outdoor installation without the need for additional power ventilation.

Heat exchanger shall be tubular in design and constructed of Type 304L stainless steel and employ (integral formed dimple restrictors, formed turbulators) to provide for an unobstructed drainage path for condensate and provide a positive pitch to promote drainage.

Additionally the gas module shall employ:

- Patented inshot gas burners, with integral carryovers, capable of operation at 5:1 turndown with modulating controls
- A combustion blower to provide for positive venting of flue gases
- Pressure switch to prove air supply for combustion
- Direct spark ignition of gas burners with remote flame sensor to prove carryover across all burners
- An automatic reset type high limit switch to limit maximum outlet air temperature to less than 250°F
- Manual reset flame rollout switch
- Listed Combination Gas Valve incorporating redundant safety shut-off valve, manual shut-off , and gas regulator which regulates gas pressure to burner supply manifold.
- Direct Spark ignition control design certified by a Recognized National Testing Laboratory and incorporating a LED diagnostic light and alarm capable contact

The completed heater assembly shall be factory fire tested prior to shipment.

#### Gas Utility

- 13.5" w.c. (1/2 PSI) Maximum Inlet Pressure
- Minimum Inlet Pressure
  - 5.0" w.c.- Natural Gas
  - 11.0" w.c.- Propane Gas

AUXILIARY GAS HEAT

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