

INDUSTRIAL DEHUMIDIFIERS

Dehumidification and Drying Solutions



Humidification, Dehumidification,
Evaporative Cooling

 **condair**

The Condair Group | Who We Are

The Condair Group, founded in 1948, and based in Pfaffikon, Switzerland, is the global leader in humidification, dehumidification, and evaporative cooling with a comprehensive portfolio including products, services, experience and know-hows. This enables us to create the ideal indoor climate while keeping the energy consumption low and reducing impact on the environment.

With its innovative air humidification systems, Condair sets new standards in the comfortable and energy-efficient “hydration” of indoor air.

With the new HumiLife product portfolio, Condair also offers individual solutions in health, productivity and sustainability for offices and private households.

Supported by science, we engineer individual, holistic solutions that customers can trust through the entire lifecycle.

Our humidification and dehumidification systems maintain ideal environments for manufacturing process, where optimized quality and productivity are essential, as well as in occupied spaces for human health and wellness. Our Evaporative Cooling solutions contribute to a sustainable world through the reduction in energy usage and provide significant cost savings for our clients.

The Condair Group consists of sales and service organizations in 22 countries, production sites in Europe, North America, and China, and has international sales partners in more than 50 locations. Our global reach has allowed us to provide solutions to every corner of the world from humidification on the Brunt Ice Shelf in Antarctica to providing the world’s largest evaporative outdoor cooling system in the Saudi Arabian city of Medina home to the largest mosques in the world.



Mission Statements

Our Mission

Driven by our customers' needs and supported by science, we engineer reliable, sustainable solutions.

- We understand our customers' specific needs and undertake to advise and support them professionally, delivering energy-optimized solutions for productivity, sustainability, and health.
- We deliver products and services that are world-class, offering industry-leading performance and quality.
- We offer our customers the assurance that all the solutions we supply will function properly and effectively throughout their whole life cycle.
- We partner with our customers through service, to help maximize and sustain the return on their investment in our air and water technologies.
- We are the global market leader in humidification, and we shape this specialist niche through innovation.
- We create a working environment that is dynamic, challenging, motivating, and rewarding for all our employees, leveraging their talents in a culture of trust, empowerment, accountability, and recognition.



Humidification | Overview

Condair commercial and residential humidification solutions have provided excellence and reliability to our clients for many years. It is Condair mission to develop market-leading solutions improving comfort and health. Condair has developed a comprehensive suite of humidification systems that enable for properties of all sizes to introduce efficient and consistent hydration and comfort control. This is the result of decades of continuous re-

search and innovation, which Condair continues to build upon to always ensure you get the most reliable and effective product possible. Condair supplies isothermal and adiabatic humidifiers. The humidifier product range is as follows in Figure 1 and Figure 2.



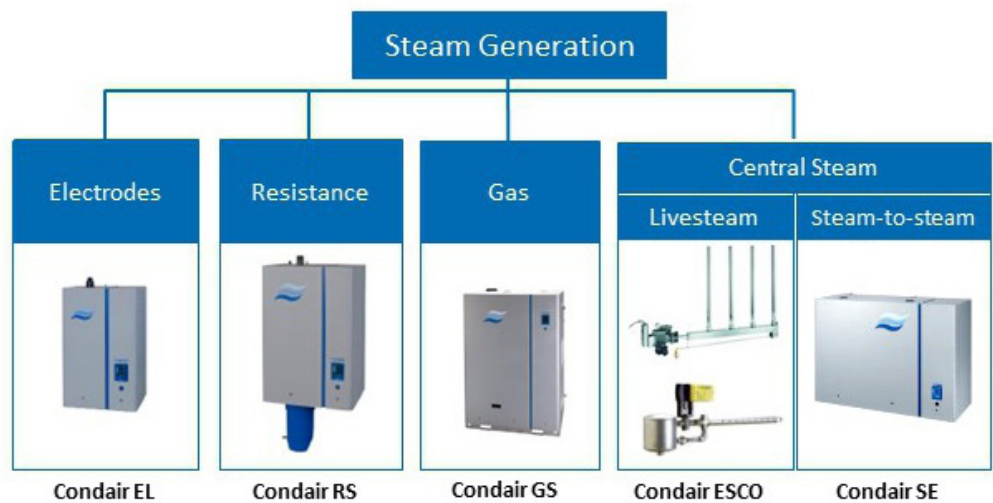


Figure 1: Isothermal Humidifier Product Range

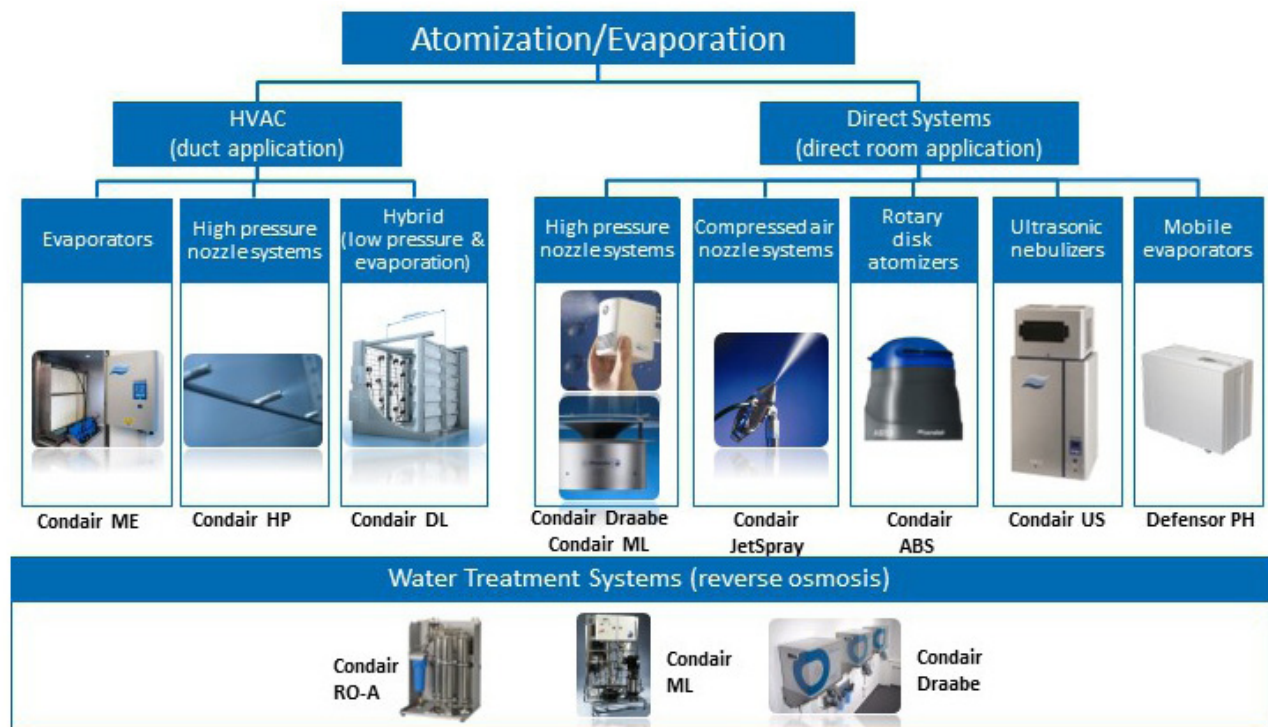


Figure 2: Adiabatic Humidifier Product Range

Dehumidification and Drying Solutions

Condair offers a wide variety of solutions for dehumidification globally. The two main types of dehumidifiers offered are desiccant and condensing

dehumidifiers. Condair’s global product range for dehumidifiers and desiccant driers as shown below.

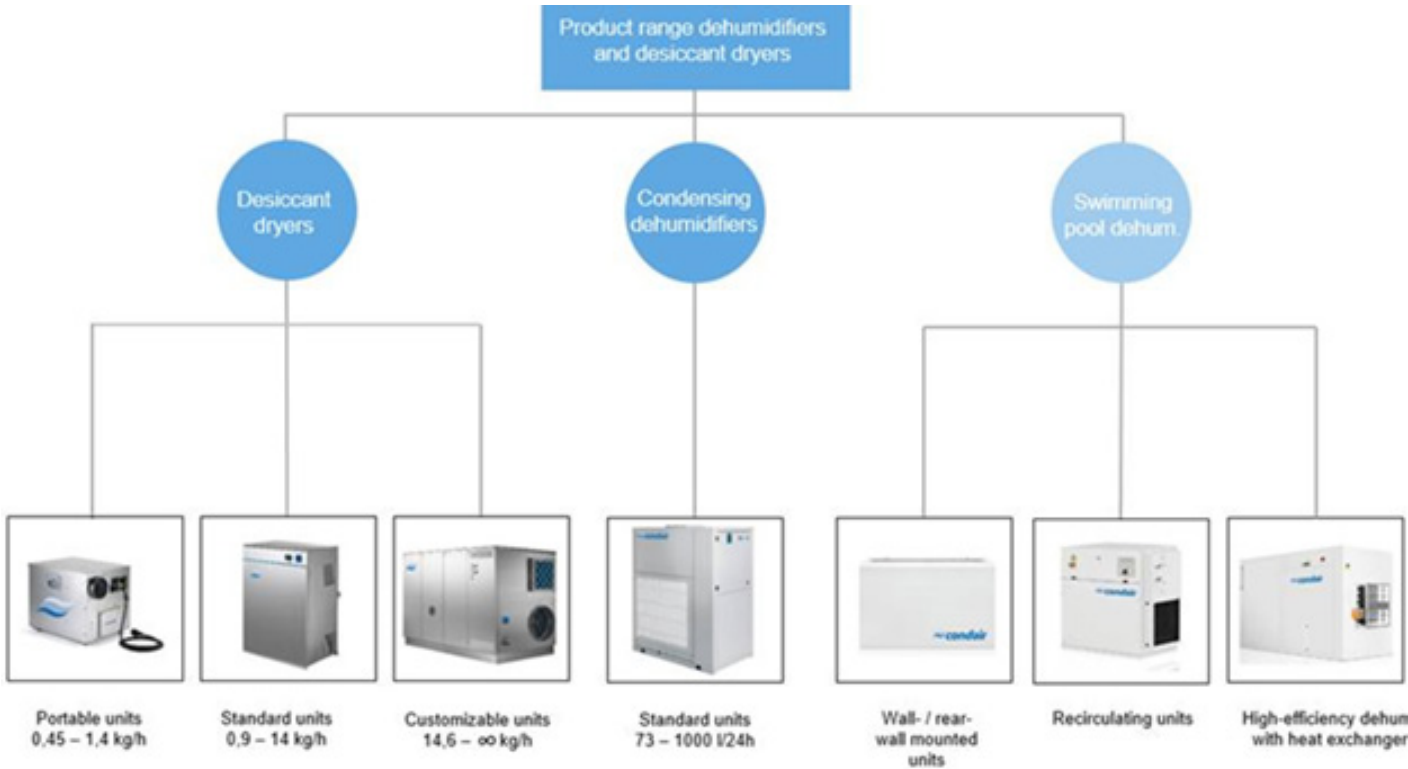


Figure 3: Dehumidifier Product Range

Desiccant Dehumidifiers | DA Series

Desiccant dehumidifiers are designed to operate in very cold conditions or wherever extremely low humidity is required. The powerful sorption rotor used in Condair DA's allow the dew points down to -94F. It is possible to go lower with very specific application and engineering if required. Standard models can be fitted with pre- and post- cooling coils prior to delivery. Post cooling coils reduce the temperature of the air coming out of the unit by the air-drying process.

Condair rotors are proprietary product made with the highest quality material and precision that are not accessible for other manufactures in the industry. Our rotor is based on silica gel desiccant and the rotor is 82% silica, 16% supporting matrix and 2% binding agent. The sorption rotor used in Condair desiccant dehumidifiers is non-flammable and silicone-free.

The standard adsorption dehumidifier units use a two-section rotor as shown in Figure 4.

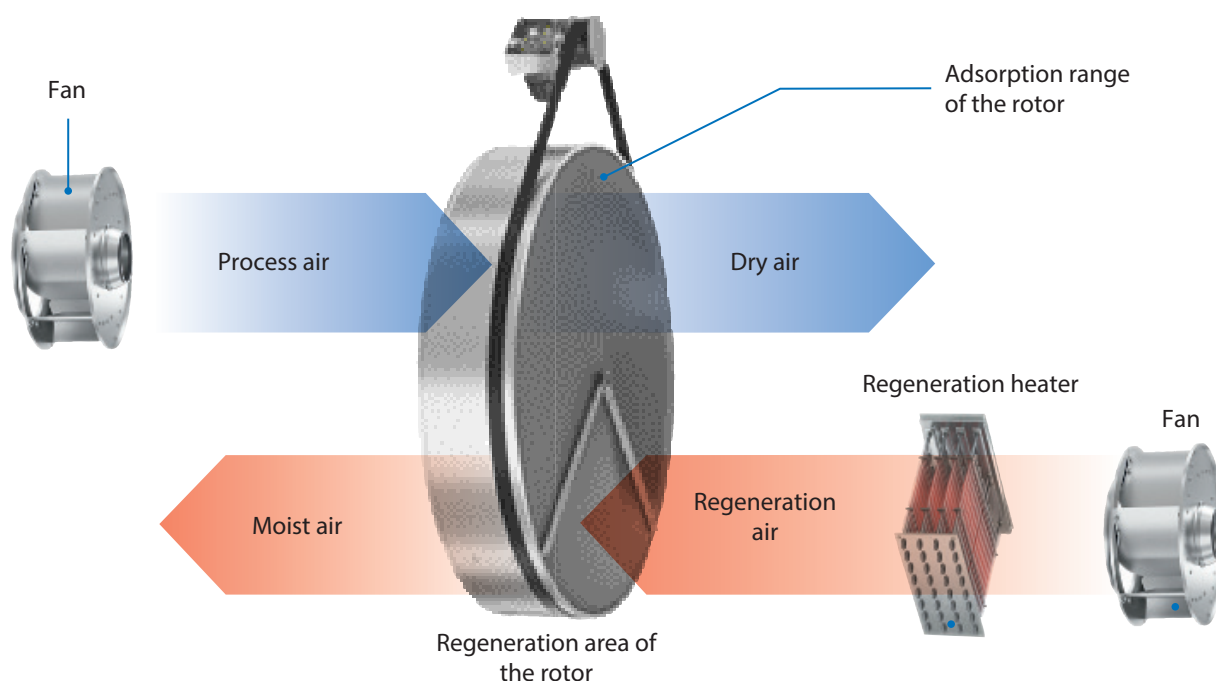


Figure 4: Desiccant Drying Principle of Operation

Desiccant Dehumidifiers | DA Series

The standard global DA models range from DA 160 to DA 9400, with process air volume ranging from 160 m³/h to 9400 m³/h (94 to 5500 CFM). We also build custom special models DA 13000SP¹, DA 19000SP¹ and DA 27000SP¹ with air volume from 13000 m³/h, 19000 m³/h and 27900 m³/h (7600 CFM, 11000 CFM and 16000 CFM).

The project-specific custom models may use a three-section rotor to meet performance if required, as shown in Figure 5.

Project specific custom units are built to specific client requirements. Units are typically delivered in assembled sections as separate modules for site installation. All units are delivered complete with fans, rotors, and filters.

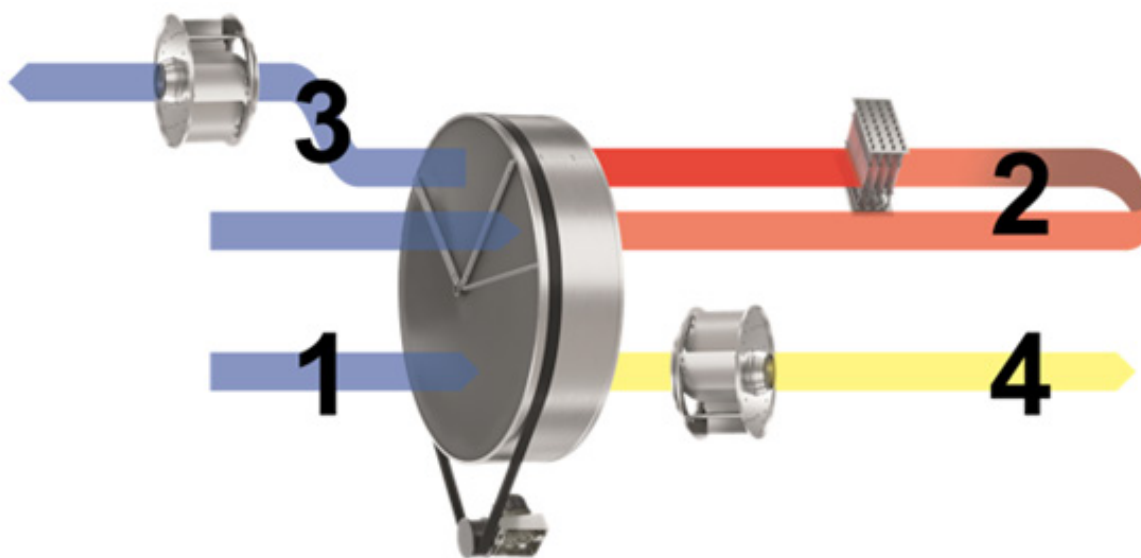


Figure 5: Custom Unit Principle of Operation

¹ Available in North America upon special request.

Condensing Dehumidifiers | DC Series

Condair offers a variety of condensing dehumidifiers in the global market. Condair condensing dehumidifiers have many different applications across the industrial, commercial, and warehousing sector. They incorporate

a refrigerant circuit system to remove moisture from the atmosphere and are typically used in areas that require a relative humidity of >50%.

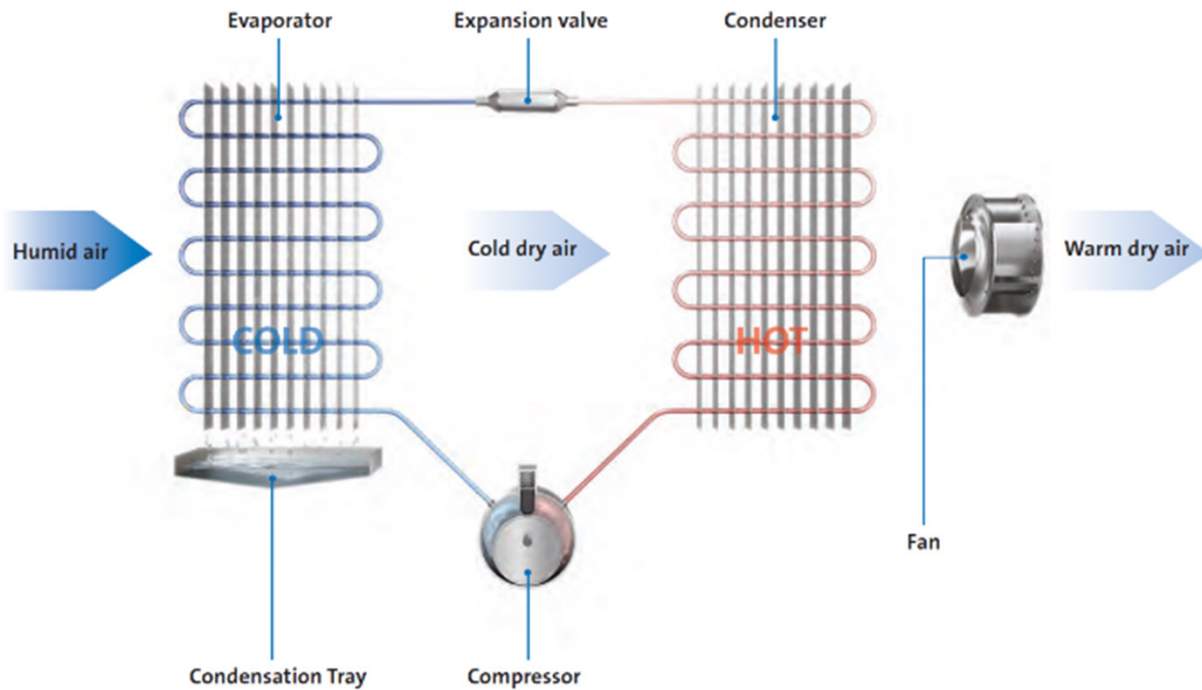


Figure 6: Condensing Dryer Principle of Operation

The DC system² can be configured in a variety of ways to meet individual project requirements. The configurations are as follow:

- Condensing Dehumidifiers (DC)
- Wall-Mounted Condensing Dehumidifiers (DC-W)
- Rear Wall-Mounted Condensing Dehumidifiers (DC-R)
- Ceiling-Mounted Condensing Dehumidifiers (DC-C)
- Condensing Dehumidifiers with Remote Heat Dissipation (DC-N)
- Condensing Dehumidifiers for Low Temperatures (DC-LT)

² Currently only available in Europe and complies with all provisions related to the European market standard.

Condensing Dehumidifiers | DC Series

The dehumidification capacity of the standard models in the Condair DC series range from 75 to 930 liters per day. Ventilation capacities are up to 8,500m³/h, enabling a single unit to maintain humidity levels for an entire building.

Units can be free-standing or positioned on a trolley for mobile use across different locations. Duct connections also enable conditioned air to be distributed via a building's air handling system.

Temperature neutral models are available with a secondary, externally located condenser. This draws some of the heat away from the dehumidifier's refrigerant circuit, allowing the dry process air to be delivered at the same temperature as the incoming air. Condair condensing dehumidifiers come with a hot-gas defrosting system as standard to ensure safe, economical operation even at low room temperatures.



Figure 7: Condair Condensing Dehumidifier DC

Desiccant Dehumidifier Overview

Desiccant dryer for industrial and commercial use. Resistant double-skin housing construction made of AluZinc[®] and RAL9006 coating. Equipped with 1.25 in. non-combustible mineral wool insulation. The desiccant dryers are stackable.

The Condair global standard DA series desiccant dryers range from DA 160 – 9400 equipped as standard with electric PTC reactivation heating. On request, custom units DA 13000SP, DA 19000SP and DA 27000SP can be supplied based on project requirements. Further modules such as pre-cooler, post-cooler, post heater or different classes expand the device. Our standard indoor units are IP21 rated. Based on the customer requirements we can build our custom units to be rated with IP56 or IP65 based on the project.

Product features

- High-performance desiccant rotor
- Robust AluZinc[®] housing with RAL9006 powder coating
- Sandwich construction with 1.25in. insulation
- Separate pushing fans for process and reactivation air
- 30-50mm insulation as standard
- Separate filters for process and reactivation air
- PLC control with touchscreen
- Comprehensive control options
- Service-friendly design

Additional options for standard units

- Pre-cooling and/or post cooling modules
- Modus TCP/IP board for PLC
- Modus RTU RS485 board for PLC
- Wet air thermostat
- Stainless Steel Casing

Additional special options for custom units

- Reheat Options
 - Steam Reheat (S)
 - Medium Temperature Hot Water Reheat (MTHW)
 - Hot Temperature Hot Water Reheat (HTHW)
 - Direct Gas Fired Reheat (G)
 - Electric Heaters (E)
- Insulated housing with panels and inspection doors
- Internal rotor purge zone with adjustable bypass.
- Carbon/HEPA filtration
- Outdoor Units IP56 or IP65 rating

The desiccant dryers are supplied ready for connections and, depending on configuration, they are connected to standard air ducts, electrical power supply and external humidity sensors.



Figure 8: DA 27000 Unit

DA Series Technical Data | Custom Units for Models DA 13000, DA 19000 & DA 27000³

Dehumidification Capacity (+68°F, 60%RH)	190-400 lb/hr
Minimum process air flow	4120-10,600 cfm
Recommended process air flow	7652-16,000 cfm
Maximum process airflow	8240-17,100 cfm
Minimum reactivation airflow	2300-4000 cfm
Recommended reactivation airflow	2400-4200 cfm
Maximum reactivation airflow	2650-4300 cfm
Heating power	132-288 kW
Reactivation options	Electric, Gas, Steam, Hot Water
Filter class process air	MERV 7/8 ⁴
Filter class reactivation air	MERV 7/8 ⁴
Power supply (3phase;50/60Hz)	143-308 kW ⁵
Weight	1350-2400 kg
****Dimension ⁶ (LxWxH)	2900 x 2400 x 2500 mm

³All the data listed in the table are based on nominal parameters, subject to final design parameters.

⁴Standard filters, other grades of filtration are available upon request.

⁵Assuming full electric regeneration.

⁶Typical dimensions for DA 27000 included however dimension may vary with construction of unit based on the requirements.

DA SERIES UNIT SPECIFICATIONS - CUSTOM UNITS

Part 1 – GENERAL

1.1 Work Included:

- a. Condair DA Series Electric Desiccant Dry er(s) as indicated on drawing[s] and as indicated on schedule[s].
- b. Complete and operable dehumidification system [which meets applicable building codes]
- c. Equipment start-up and project inspection by qualified factory trained representatives.

1.2 Quality Assurance:

- a. Certifications, C-UL US Listed [on site or before delivery based on requirements]
- b. ISO 9001
- c. ANSI/NFPA 70 – National Electrical Code.

1.3 Related Sections:

- a. 23[] Mechanical General
- b. 23[] Ducting Installation
- c. 23[] Ducting Requirements
- d. 23[] Control System

1.4 Submittals:

- a. Submit product data under provision of Section 23. Include product descriptions, model, dimensions, component sizes, rough-in requirements, service sizes, and finishes. Include rated capacities, operating weights, furnished specialties and accessories.
- b. Submit manufacturer's installation instructions.
- c. Submit operation and maintenance data.
- d. Submit coordination drawings. Detail fabrication and installation of dehumidifiers. Detail dehumidifiers and adjacent equipment. Show support locations, type of supports, weight on each support, and required clearances.
- e. Submit wiring diagrams including power, signal, and control wiring. Differentiate between manufacturer-installed and field installed wiring.

1.5 Schedules:

- a. Refer to information contained in schedule[s]

attached to this specification.

- b. Dehumidifiers to be of type, capacity, and arrangement as listed in schedule[s].
- c. Include accessories listed in schedule[s] and those accessories required for type of unit.

1.6 Warranty

Condair Inc. and/or Condair Ltd. (hereinafter collectively referred to as THE COMPANY), warrant for a period of two years after installation or 30 months from manufacturer's ship date, whichever date is earlier, that THE COMPANY's manufactured and assembled products, not otherwise expressly warranted, and free from defects in material and workmanship. No warranty is made against corrosion, deterioration, or suitability of substituted materials used as a result of compliance with government regulation.

- a. THE COMPANY's obligations and liabilities under this warranty are limited to furnishing replacement parts to the customer, F.O.B. THE COMPANY's factory, providing the defective part(s) is returned freight prepaid by the customer. Parts used for repairs are warranted for the balance of the term of the warranty on the original humidifier or 90 days, whichever is longer.
- b. THE COMPANY makes no warranty and assumes no liability unless the equipment is installed in strict accordance with a copy of the catalog and installation manual in effect at the date of purchase and by a contractor approved by THE COMPANY to install such equipment.
- c. THE COMPANY makes no warranty and assumes no liability whatsoever for consequential damage or damage resulting directly from misapplication, incorrect sizing or lack of proper maintenance of the equipment.
- d. THE COMPANY makes no warranty and assumes no liability whatsoever for damage resulting from freezing of the humidifier, supply lines, drain lines, or quality of the water used.
- e. THE COMPANY retains the right to change the design, specification, and performance criteria of its products without notice or obligation.

DESICCANT DEHUMIFIERS – MODEL CONDAIR DA SERIES

PART 2 – PRODUCTS

2.1 Provide Condair DA Series Electric Desiccant Dryer that dries the process air stream. Packaged unit, floor mounted, desiccant dehumidifier using self-regulating PTC electric regeneration heaters or

- a. [Incoloy electric regeneration heaters]
- b. [Boiler Steam Reheat (pressure steam)]
- c. [Direct Gas Fired Reheat]
- d. [Hot Water Reheat]

are available. Combination regenerative heating are available for high precision control.

2.2 Unit[s] to be complete packaged system with:

- a. Touchscreen controller with building automation protocol:
 - i. Intuitive touchscreen control with color graphic user interface.
 - ii. Building automation communication protocols Modbus. Modbus TCP board for PLC or Modbus RTU RS484 board for PLC
 - iii. Electronic to be mounted within unit cabinet and to be isolated from system airflow
- b. Packaged system:
 - i. Operational Ambient conditions between 0-100%RH non-condensing and -30 to 40°C (-22 to 104°F).
 - ii. Packaged unit single cabinet in a durable, Aluzinc, powder painted to RAL 9006, corrosion resistant cabinet. Double walled cabinet housing insulated fill 30 mm (1 ¼") [100mm] non-combustible mineral wool material. Stainless Steel housings available on request.
 - iii. All service connections conveniently located for easy installation.
 - iv. Zero Top and Back side clearance requirement for minimal installation footprint.
 - v. Use of self-regulating PTC heaters [Resistive Element Technology] [Boiler Steam (pressure steam)] [Direct Gas Fired Technology] for reactivation heating source.

- vi. Fans housed inside of cabinetry for reduced operating noise.
- vii. Separate process and reactivation direct driven fans powered by [EC] [AC] motor, common shaft or belt driven fans are not accepted
- viii. Unit shall have [EC] [AC] motor driven fans supplying air by pushing to avoid wheel heat exposure in supply air.
- ix. Unit shall have [EC] [AC] motor drive regeneration air fans pushing air pre-activation process.
- x. Unit to include integral filter housing section allowing access for filter replacement service.
- xi. Units shall include MERV 7/8 [Carbon Filters] [HEPA Filtration] separate filters for process and reactivation air included.
- xii. Unit to include maintenance free bearings.
- xiii. Fully C-UL-US listed [on site or pre delivery]

c. Silica Gel desiccant rotor:

- i. Vertically mounted with horizontal airflow.
- ii. Unit must be equipped with an inductive rotor guard.
- iii. Manufacturer designed and produced rotor; no third party supplied rotors.
- iv. [Rotor with built-in purge zone for heat recovery].

2.3 Optional Accessories

- a. [Pre-cooling coil] [post-cooling coil] [post-heating coil] available.
- b. Contact Condair directly for specify accessories not listed above.
- c. Dual Rotor with intermediate coils available for special custom units (DA 13000 to DA 27000).

PART 3 – EXECUTION

3.1 Installation:

- a. Install dehumidifiers per manufacturer's instructions.
- b. Install with required clearance for service and maintenance.

3.2 Accessories:

- a. Install accessories in accordance with manufacturer's recommendations.

3.3 Commissioning:

- a. Start-up of dehumidifier to be by Condair factory trained technician.

