



REFRIGERATION REVIEW

Desiccant Air Treatment

As much as I love the mechanical refrigeration cycle, there are some applications of dehumidification that need another technology. This technology is desiccant dehumidification. Over the years there have been numerous cases where moisture-sensitive areas such as low-ceilinged docks, process areas that have continuous water on the floor, doorways between freezers and coolers, and more recently, spiral freezer conveyor belt openings that need special treatment.

Many times temperature sensitive areas can be assisted with things like heat lamps, radiant heaters, and heater cables embedded in the doorway concrete wearing floors, but in many cases the most positive way to deal with moisture sensitive areas (areas that have surface temperatures below the dew point of the air around it) is the use of desiccant air units.

We have used reheat on dock air units for many years, which basically helps to keep the coil active by dehumidifying the dock air to help minimize frost and ice around freezer dock doors.

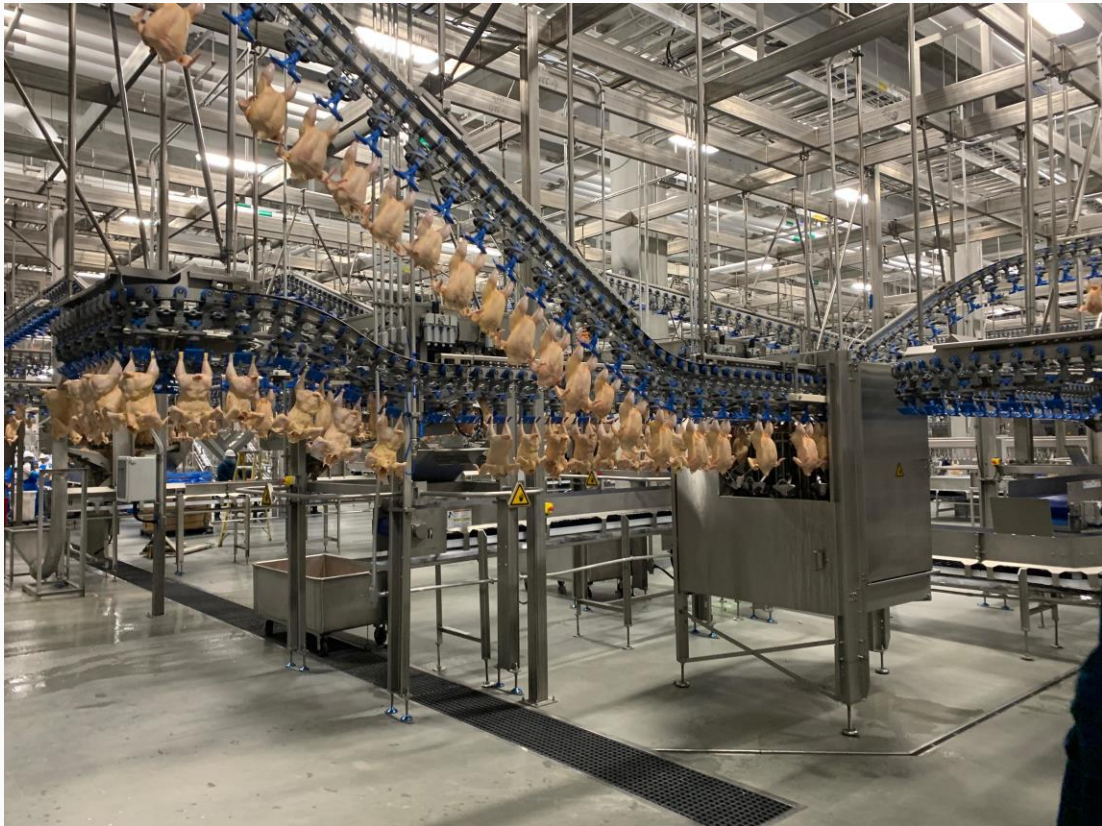
Years ago we had an ice cream spiral freezer that was being installed in a production area and it occurred to me that if we bathed the in- and outfeeds of the spiral freezer belts with desiccant air we can help minimize the frost accumulating on the spiral freezer refrigerant coils. Little did I know how well it

would work in that the end user found out he didn't need to defrost the coil but once a week, if that often, but they set it up as their standard procedure. It would be well to note that the process units in the room around the spiral freezer also had reheat after the refrigeration coil to help maintain the room conditions. Noteworthy, with spiral freezers, it's important that the infeed and outfeed conveyor holes in the spiral freezer walls experience as close to the same air pressure as possible, occasionally a freezer conveyor will have the infeed at one end of the freezer and the outfeed at another end of the freezer, which makes the fan air pressure vastly different, and far more difficult to keep the openings "bathed" in dry air.

I also had an occasion in a wharf facility in New Orleans where the manager wanted to have the doorways that would handle two-way fork truck traffic directly from the freezer to the wharf. To do this, I set up a 25-foot-deep vestibule with three different strip-curtain chambers, each with horizontal blowers and heat. The first chamber also had a 350 cfm desiccant unit which maintained a pocket of dry air. You could take a UV temperature meter and read the floor temperature from outside and inside and the floor temperature would vary without moisture condensing on the floor or in the freezer doorway. Noteworthy of this installation was that Hurricane Katrina knocked that warehouse offline and the doorways and floors had to be reconstructed. After reconstruction, I was told that the wharf doors created "snow" on the inside of the freezer doors. I asked if the desiccant units had been replaced and/or turned on, and they said no. Once they were turned on, the snow disappeared – a good example of a desiccant system at work.



Example of a good location for a desiccant unit -- spiral freezer outfeed.



Another example of a great location for a desiccant unit -- a poultry processing area where the USDA requires frequent washing down of the floors and equipment.

HC Series

Desiccant Dehumidifier



Product Description

Munters off-the-shelf desiccant dehumidifiers combine state-of-the-art desiccant technology with dependability and long operating life for humidity control at virtually any temperature.

Process Air: Flow rates of 150-300 scfm. Nominal moisture removal: 7.9 lbs/hr at 75°F, 50% RH at 300 scfm. Capable of processing saturated, conditioned or outside air.

Contact Air Seals: Separate process and reactivation air streams.

Electrical Controls: Automatic restart after power failure. Contacts for remote run and fault status. Elapsed time meter. Simplified controls using relay logic. 24 VAC signal wiring allows for low voltage wiring of humidistat. Control system monitors and controls unit function.

Drive System: Simple drive belt arrangement, few moving parts.

Reactivation Utility: Energy modulation feature independently controls heater power to minimize energy consumption.

Dehumidifier Housing: Process and reactivation air flow insulation. Blower motors and controls isolated from air streams. Process and reactivation fan guards provided for safety. Volume control dampers for process and reactivation air streams. All welded aluminum cabinet. Compact size for minimum space requirements and easy installation.

PRODUCT INFORMATION

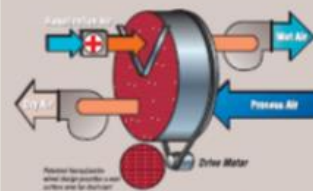
HC-300

OFF-THE-SHELF DEHUMIDIFIER

Advantages

- Efficient humidity control for applications including product drying, mold and mildew control, corrosion protection, storage and condensation control
- Durable unitized body with welded aluminum construction
- Easy access panel for inspection and maintenance
- Simple ductwork connections
- Compact, low profile design

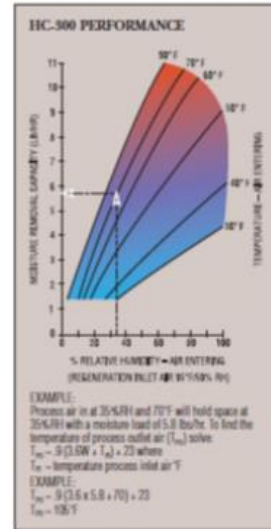
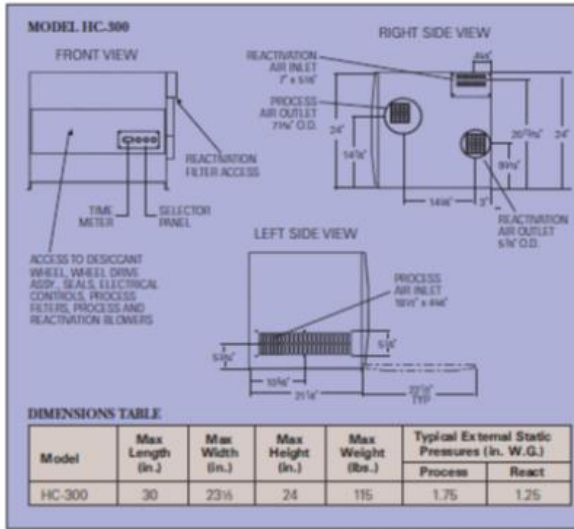
Desiccant Rotors



In the 1950's Munters invented modern industrial dehumidification when it introduced the self-regenerating desiccant rotor, the heart of the dehumidifier.

Today, Munters offers rotors with five desiccant formulations and is the acknowledged expert in the integration of rotors into dehumidification systems and air handlers.

 **Munters**
The Humidity Expert



Suggested Specification Guide:

Dehumidifier shall be of a type proven in satisfactory operation for a minimum of ten years. Dehumidifier shall be of the non-cycling sorption type with a single desiccant rotary structure. The casing will be fabricated as a unitized body with welded aluminum construction for maximum strength and durability. Suitable access panel shall allow access for inspection or servicing without disconnecting ducting or electrical wiring. Airflow balancing dampers to be furnished.

The rotary structure shall be a monolithic fabricated extended surface consisting of inert silicates reinforced with uniform diameter glass fibers for maximum strength. The fabricated structure shall be smooth and continuous in the direction of airflow without interruptions or sandwich layers which restrict airflow or create a leakage path at joining surfaces. Desiccant shall not channel, cake or fracture due to repeated temperature and moisture cycling. The materials of construction shall be non-toxic and NFPA 255-ASTM F84 compliant.

Full face contact pressure seals shall be provided to separate the process and reactivation air streams and eliminate detrimental leakage of air or moisture with static pressure differentials of up to 3" of water gauge.

Dehumidifier shall be factory assembled, fully automatic, complete with HoneyComb desiccant wheel, reactivation heaters, reactivation energy control system, roughing filters, industrial drive motor, fan, non-ratcheting desiccant drive unit, automatic controller and all components' auxiliaries. Reactivation energy modulation shall be stepless solid state proportioning type. Dehumidifier shall be functionally tested at the manufacturer's factory and shipped complete with all components necessary to maintain normal operation.

**Continual engineering and research for product improvement may result in design and specification changes. Consult factory for certified industrial data.*

Technical Specifications*

Utilizes: 220/1/60, 230/3/60, 460/3/60 +10%

Process Volume: 150-300 scfm

Max Reactivation Volume: 100 scfm

Max Reactivation Heater:
HC-300 - dLW

Maximum FLA:
HC-300 - 33A @ 220V/1/60Hz
HC-300 - 19A @ 230V/3/60Hz
HC-300 - 9.7A @ 460V/3/60Hz

Process Air Blower: E.S.P. 1.75" W.G.
Reactivation Air Blower: E.S.P. 1.25" W.G.

Max dBA: 75 (3 feet from dehumidifier except in path of air flows)

Washable metal roughing filters

Options:
• Humidistat for on/off control
• Constant process blower
• Process inlet transitions for round duct

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Brand of desiccant units we have installed in numerous facilities.