

**PD-Series**



# Desiccant Dehumidification Air Handlers

**DRAFT**



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PHOENIX AIR SYSTEMS™ desiccant dehumidification air handling systems are used to help control moisture; prevent mold, corrosion and moisture regain; as well as assist in product drying and dry cooling. This technology benefits a variety of applications in a wide range of markets, including food processing, process manufacturing, materials handling; commercial applications such as hospitals, schools, office buildings and museums; and military applications such as storage and asset preservation areas.

With twelve standard sizes and a variety of custom configurations (up to 100,000 SCFM) and options, these units offer the design flexibility of a custom system. For customer convenience and satisfaction, each system is factory-tested and includes start-up by factory-trained technician. In addition, a standard programmable logic controller (PLC) based control system is included for a tighter environmental control of the area to help maximize production and profits.

Phoenix Air Systems' team of experts has the experience in the design and application of desiccant systems that can help ensure a project's success. Close collaboration is key in each step of the process: concept and proposal, design, manufacturing and commissioning, with outstanding support after the sale.

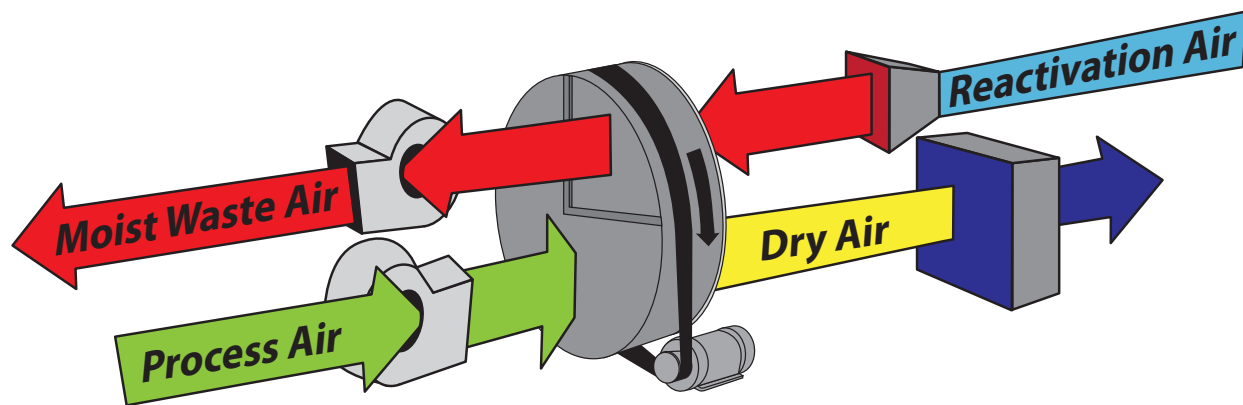


## The Importance of Clean, Dry Air

Many commercial, industrial and institutional applications require clean, dry air to help ensure the safety and quality of processes, environments and finished products. PHOENIX AIR SYSTEMS™ desiccant dehumidification systems can help meet these requirements through the removal of particulates, pathogens and odor, as well as through humidity and temperature control.

In sensitive applications, even the smallest amount of moisture can adversely affect the environment. To help control moisture, proper sizing, construction and choice of options are all important considerations.

### How do PHOENIX AIR SYSTEMS™ Desiccant Dehumidification air handlers provide clean, dry air?



The desiccant dehumidification system blows air through a rotating desiccant wheel that absorbs moisture. The desiccant wheel, constructed from a silica impregnated media, is divided into two sections: the process section and the reactivation section. The desiccant wheel continually rotates through the moisture-laden process air stream, retaining water droplets on the media. The media then rotates through the reactivation section, releasing the absorbed moisture into the superheated air stream, which is then exhausted outdoors.

Composed of 98% inorganic content to withstand high heat, the PD-Series desiccant wheels are one of the industry's leaders in terms of density, desiccant load and pressure drop ratings. In addition, the wheel and wheel frame are built with durable components.



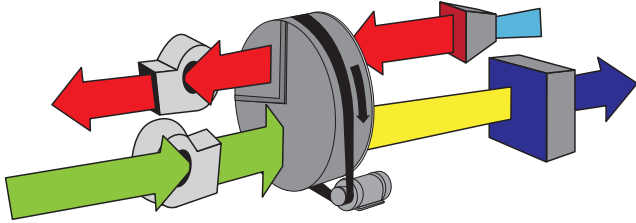
PHOENIX AIR SYSTEMS™ desiccant dehumidification air handlers are available in three configurations:

## 75/25 Split

**Design:** 75% of the wheel surface is utilized for process air, 25% is utilized for reactivation.

**Function:** Removes moisture from recirculated or mixed air stream.

**Application:** Helps to control condensation and remove moisture in food and industrial process applications. Utilizes medium to high (250° F - 300° F [121° C - 149° C]) reactivation temperatures and controls dew point temperatures as low as -20° F (-28° C).

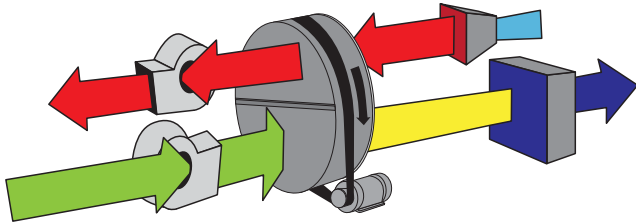


## 50/50 Split

**Design:** 50% of the wheel surface is utilized for process air, 50% is utilized for reactivation.

**Function:** Removes moisture from mixed air or make up air stream.

**Application:** Removes moisture in applications with high concentrations of outdoor air and make up air. Utilizes low to medium (160° F - 200° F [71° C - 93° C]) reactivation temperatures.

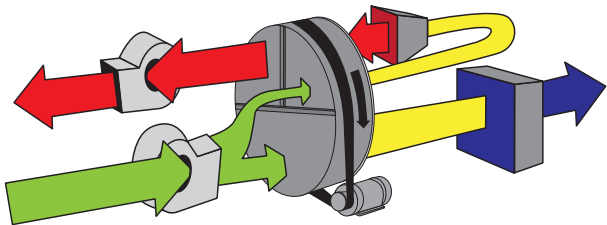


## 50/25/25 Split

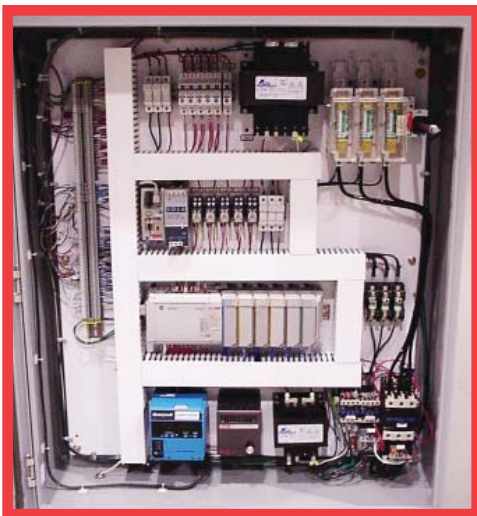
**Design:** 50% of the wheel surface is utilized for process air, 50% is utilized for reactivation. Dry air is heated and used for reactivation, allowing it to absorb more moisture.

**Function:** Removes moisture from recirculated, mixed or outdoor air stream.

**Application:** Removes moisture and helps control very low dew points, down to -80 °F (-62° C).



## Desiccant Dehumidification Controls



The proper application of a desiccant dehumidification system can sometimes have many complex operations happening simultaneously inside the system. These various operations can be intricate and can majorly influence the psychrometrics (the properties of the air that is supplied by the system.) That's why at the heart of the PHOENIX AIR SYSTEMS™ desiccant dehumidification unit is a PLC control system, supplied as standard.

These standard 16 bit or optional 32 bit microprocessors possess the computing power to bring even the most challenging applications down to size. Since we use PLC systems as standard, our engineers work with these control systems daily. Phoenix Air Systems engineers have a wealth of knowledge and experience to provide PLC based controls that focus on the efficiency of the entire system's operation, and still deliver air that is precise and to specifications. Psychrometric functions performed by the PLC to help the unit better manage energy and improve efficiency, helping to result in a smarter, more accurate application than traditional electro-mechanical designs.

A touch screen Human Machine Interface is provided on the unit control panel for single point tuning, calibration, monitoring, and alarm reporting of the system. Phoenix Air Systems can also provide a remote mounted touch screen HMI for remote monitoring in a control room. The control system can also be seamlessly integrated into a Building Management or Refrigeration Control System in most cases. Devices are mounted, wired and commissioned at the factory. In addition, our factory technicians provide turn key operation at start up. Our knowledgeable and experienced personnel can help provide assistance and expertise to create the controls solution suited for your application.



## Dampers

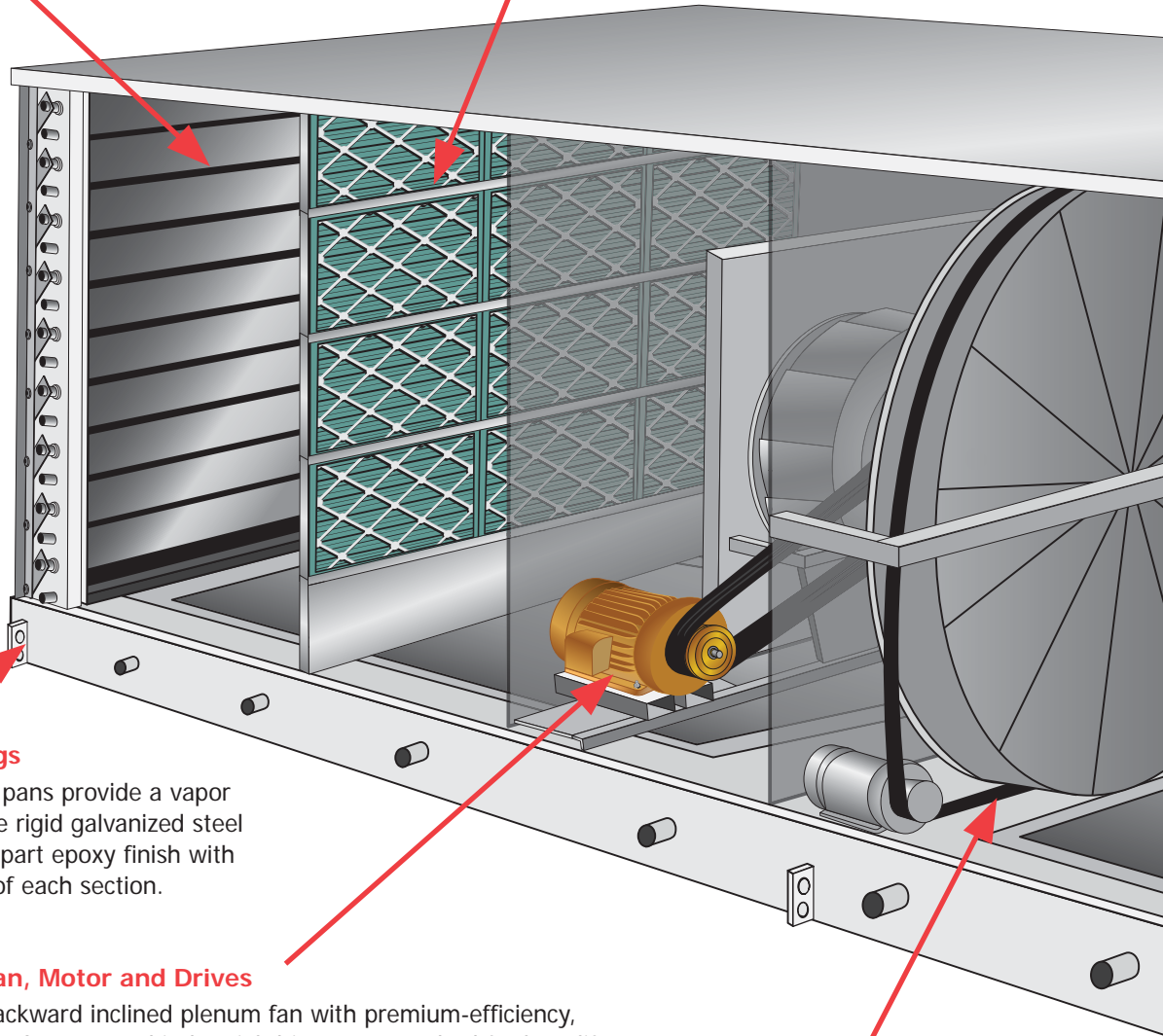
Low leak galvanized frame dampers have extruded aluminum blades and stainless steel side seals, control linkage and pins with NEMA 4 actuators. Stainless steel construction and double walled, insulated construction are optional.

## Mixing Box

Mixing box lowers outside air velocities to help minimize water carryover and help ensure blending of outside and return air.

## Pre-Filters

4-inch pre-filters in a flat panel arrangement with external access door helps ease maintenance, extend final filter life and lower pressure drop. Separate outside air and return air filters help lower overall operational costs.



## Unit Frame & Lifting Lugs

Fully foamed in place drain pans provide a vapor seal and thermal break. The rigid galvanized steel frame is coated with a two-part epoxy finish with lifting lugs on each corner of each section.

## Fan, Motor and Drives

Backward inclined plenum fan with premium-efficiency, TEFC motor and industrial drives are standard for long life.

## Heating Options

Heating options include steam, hot water, hot gas re-claim, direct-fired and indirect-fired gas. Heaters are controlled with a high turndown ratio to help assure accurate temperature control.

## Desiccant Wheel

High desiccant load with rating of 82% and 16 lb. per cubic foot optimum density with low pressure drop rating. The wheel is flame-resistant and smoke production rated 0/0 per ASTM E-84. Wheel is water washable and wheel frame is constructed with a thick wall, DOM tubing, 10 ga. stainless steel rim and spokes. The media retention strip is welded.

Optional face and bypass dampers help prevent over-drying of the process air, maximize efficiency and provide greater dewpoint control.

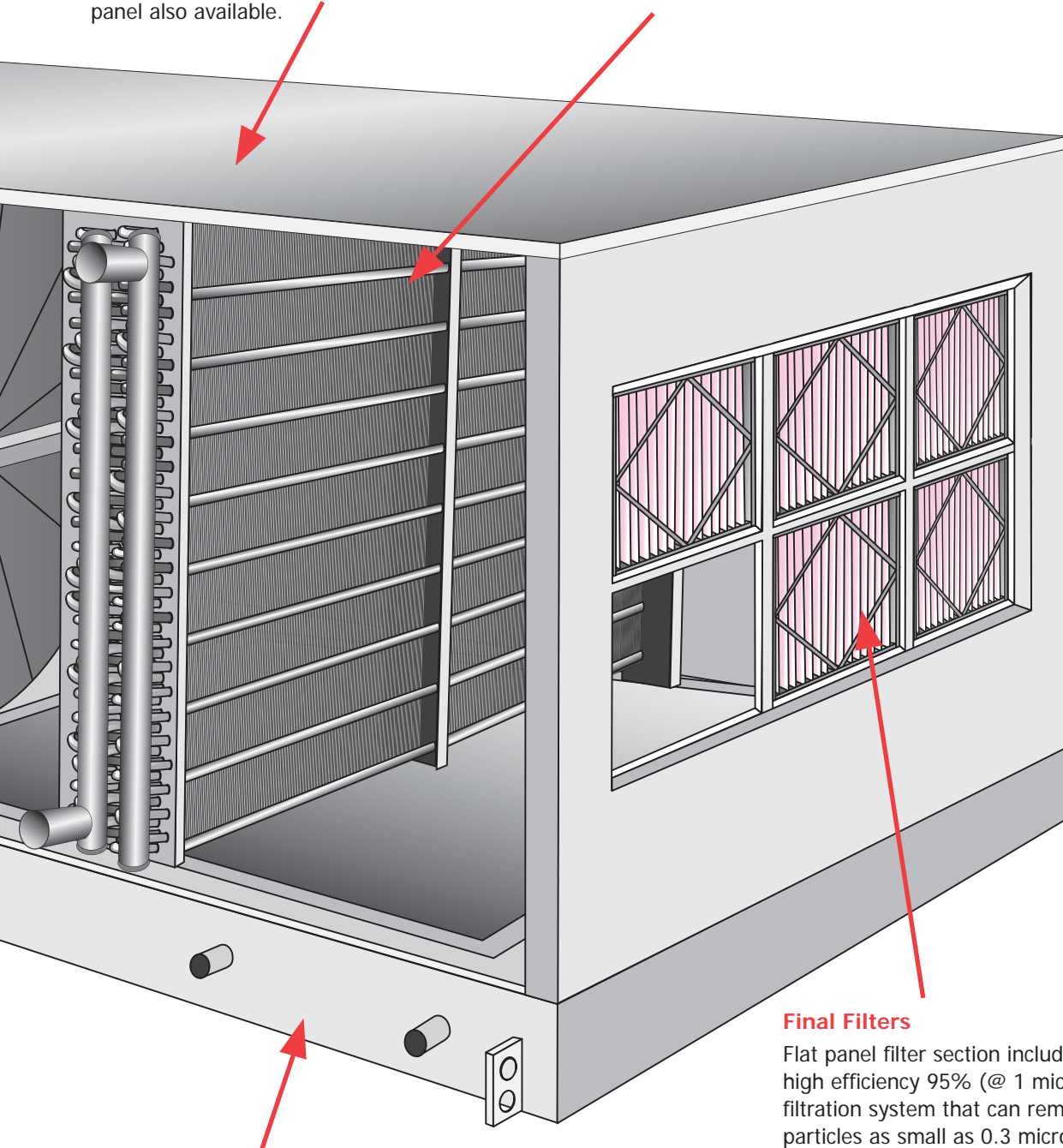
# Desiccant Dehumidification Air Handler

## Exterior Panels

2-inch insulated exterior cabinet with galvanized interior liner without interior fasteners, helps ensure a smooth, watertight surface that will allow for thorough cleaning. Optional stainless steel interior and 4-inch insulated panel also available.

## Coils

Industrial refrigeration coils are galvanized steel or aluminum construction with optional stainless steel tube/aluminum fin construction. For Freon and Glycol applications, copper/aluminum coils are available. Connection piping is located out of the air stream for improved safety and serviceability. Ultraviolet (UVC) emitters for pathogen control are also available as an option.



## Drain Pans

Each section has an 18 gauge stainless steel, positive draining pan to help remove condensation and prevent standing water in the airstream.

## Final Filters

Flat panel filter section includes filter options of high efficiency 95% (@ 1 micron) filters or HEPA filtration system that can remove up to 99.97% of particles as small as 0.3 microns. Standard differential pressure gauge monitors filter life, with dedicated filter access door for easy upstream loading of filters. Optional stainless steel holding frames and fasteners also available.



## Designed with efficiency in mind.

Phoenix Air Systems is constantly striving to design and manufacture forward-thinking, rugged industrial-grade systems. PD-Series units utilize advanced components and controls to help maximize efficiency and minimize operating and maintenance costs. Premium-efficiency, totally-enclosed, fan-cooled (TEFC) motors help maximize system efficiency via an optional face and bypass damper assembly. This assembly modulates the proportion of total airflow allowed to pass over the dessicant wheel, while maintaining consistent process air moisture levels at varying capacities. As a result, less energy is expended when ambient conditions are less severe than design.

This pinpoint control of the process air's humidity and temperature levels can save manufacturers thousands of dollars annually by helping reduce waste, improve product quality and save energy.

### Features

### Benefits

<ul style="list-style-type: none"> <li>• Rugged, industrial dehumidification wheel</li> </ul>	<ul style="list-style-type: none"> <li>• Withstands the rigors of industrial process environments</li> </ul>
<ul style="list-style-type: none"> <li>• Insulated, double walled construction</li> </ul>	<ul style="list-style-type: none"> <li>• Limits loss of conditioning and helps minimize exterior condensation for a cleaner, more energy-efficient installation</li> </ul>
<ul style="list-style-type: none"> <li>• Separate regeneration heating section with multiple heating source options</li> </ul>	<ul style="list-style-type: none"> <li>• Provides design flexibility and greater moisture removal</li> </ul>
<ul style="list-style-type: none"> <li>• Design with minimal horizontal surfaces</li> </ul>	<ul style="list-style-type: none"> <li>• Limits flat surfaces for moisture to accumulate</li> </ul>
<ul style="list-style-type: none"> <li>• Multiple heating and cooling options</li> </ul>	<ul style="list-style-type: none"> <li>• Provides versatility</li> </ul>
<ul style="list-style-type: none"> <li>• Positive draining, foamed-in-place, stainless steel pans in each section</li> </ul>	<ul style="list-style-type: none"> <li>• Facilitates removal of condensation and moisture from each section of the unit</li> </ul>
<ul style="list-style-type: none"> <li>• Premium-efficiency, TEFC motors and backward incline plenum fans</li> </ul>	<ul style="list-style-type: none"> <li>• Provides even, efficient airflow pattern</li> </ul>
<ul style="list-style-type: none"> <li>• Full-size, positive-latch access doors with thermal break in each section</li> </ul>	<ul style="list-style-type: none"> <li>• Allows entry to unit sections and components for ease of service and cleaning. Thermal break helps prevent condensation.</li> </ul>
<ul style="list-style-type: none"> <li>• End, bottom, side and top return air options</li> <li>• Multiple outside air filtration options</li> </ul>	<ul style="list-style-type: none"> <li>• Flexible design helps provides protection from contaminants with multiple pre, intermediate and final filtration options</li> </ul>
<ul style="list-style-type: none"> <li>• Industry-leading PLC-based control system</li> </ul>	<ul style="list-style-type: none"> <li>• Enables efficient monitoring of system status and seamless integration with most building management and process control systems. Optional Ethernet capability further expands your ability to monitor each aspect of the environment.</li> </ul>
<ul style="list-style-type: none"> <li>• Optional hygienic construction; smooth walls without internal fasteners</li> </ul>	<ul style="list-style-type: none"> <li>• Minimizes horizontal surfaces that catch mold, bacteria and other pathogens</li> </ul>
<ul style="list-style-type: none"> <li>• Optional wash down capability</li> </ul>	<ul style="list-style-type: none"> <li>• Easy to sanitize throughout the system</li> </ul>
<ul style="list-style-type: none"> <li>• Optional ultraviolet (UVC) emitters and multiple filtration levels and options</li> </ul>	<ul style="list-style-type: none"> <li>• Helps terminate and trap mold, bacteria and viral microorganisms in the system, removing them from the process air stream, providing a cleaner environment</li> </ul>
<ul style="list-style-type: none"> <li>• Optional interior service lights</li> </ul>	<ul style="list-style-type: none"> <li>• For ease of service</li> </ul>



# PHOENIX AIR SYSTEMS™ PD-Series Applications



## Corrosion Prevention

- Military Storage
- Electronics Protection
- Power Plant Lay-up
- Lithium Battery Production



## Mold Prevention

- Archival Storage
- Seed Storage
- Cargo Protection
- Breweries



## Product Drying

- Investment Casting
- Plastic Resin Drying
- Candy Coating
- Meat/Fruit Drying



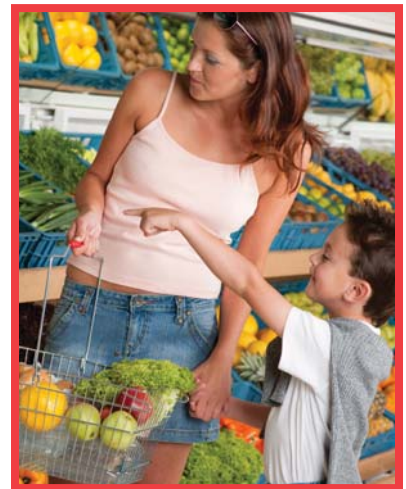
## Condensation Prevention

- Raw/Frozen Food Processing
- Ice Rinks
- Water Treatment Plants
- Surface Preparation and Coating
- Injection Molding



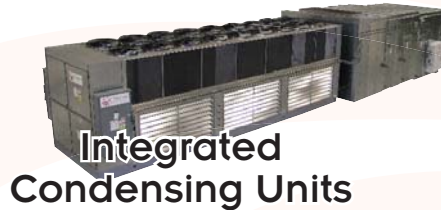
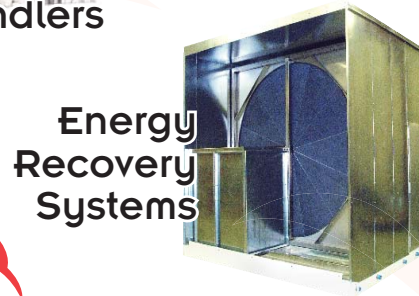
## Moisture Regain Prevention

- Advanced Composite Manufacturing
- Candy Packaging
- Semiconductor and Pharmaceutical Clean Rooms
- Glass Laminating



## Dry Cooling

- Hospitals
- Supermarkets
- Hotels
- Sick Buildings
- Advanced HVAC System



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**Installation Code and Quarterly Inspections:**

All installation and service of PHOENIX AIR SYSTEMS™ equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Phoenix Air Systems and conform to all requirements set forth in the PHOENIX AIR SYSTEMS™ manuals and all applicable governmental authorities pertaining to the installation, service and operation of the equipment. To help facilitate optimum performance and safety, Phoenix Air Systems recommends a qualified contractor conduct quarterly inspections of your PHOENIX AIR SYSTEMS™ equipment and perform service where necessary, using only replacement parts sold and supplied by Phoenix Air Systems.

**Further Information:** Applications, engineering and detailed guidance on system design, installation and equipment performance is available through PHOENIX AIR SYSTEMS™ representatives. Please contact us for any further information you may require, including the Installation, Operation and Service Manual.

**These products are not for residential use.**

**This document is intended to assist licensed professionals in the exercise of their professional judgment.**

**Phoenix Air Systems**

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