Concepts and Designs
INCORPORATED

Make Up Air Dehumidification MDH Series

Solutions for Indoor Air Quality

Concepts and Designs, Inc.

Concepts and Designs, Inc. (CDI) originated in 1989 in Owatonna, Minnesota. Years of HVAC industry experience established the foundation for today's thriving company.

Our goal is to provide customers with high quality, energy efficient solutions for indoor air quality.

CDI designs and manufactures a broad array of custom air handling systems for facilities. Products include dehumidification, custom air handling, cooling and heating equipment.

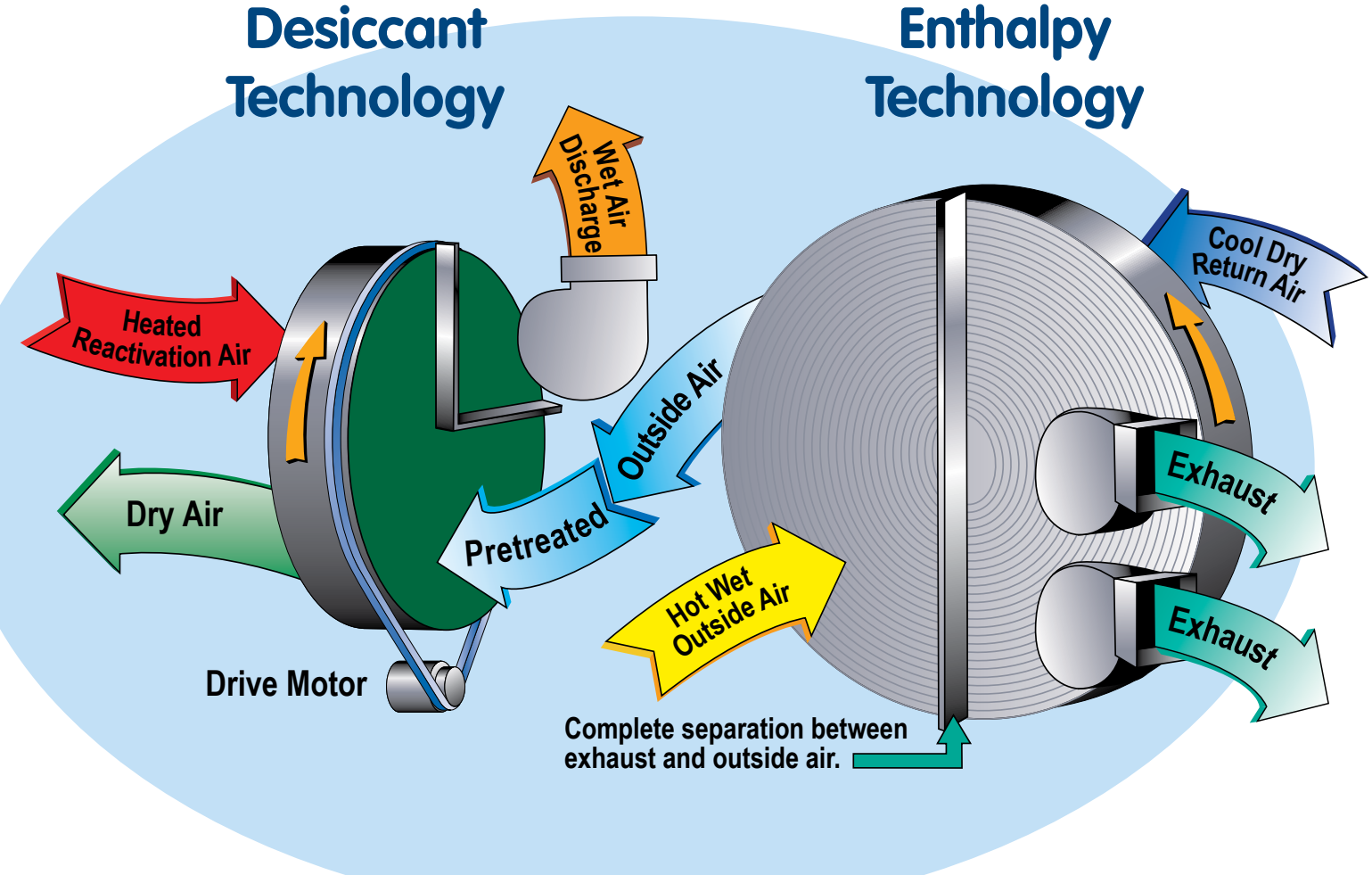
Our products offer indoor air quality solutions for facilities requiring controlled air climates: Food Processing, Ice Arenas, Waster Water Treatment Plants, Pharmaceuticals, Automotive, Rental, Healthcare and Aviation. We provide climate control products worldwide including; Canada, Mexico, Russia and China.

Our products are designed utilizing internally developed "Climate by Design" software. This software is used by our sales engineers, manufacturing representatives and associates to configure and predict the performance of an air handling unit.

We understand and are responsible to the critical nature of our customers' processes. We provide services and training to meet customer requirements for a favorable climate and environment. Services range from preventative maintenance to prescriptive plans for a specific application.

Desiccant Technology

Enthalpy Technology



Importance of Indoor Air Quality

With rising energy costs, building construction has become tighter to conserve energy. Tighter construction has led to increased problems with indoor air quality. Today, indoor air quality is an important design criterion. The challenge is how to efficiently and effectively bring in fresh outside air without disturbing the indoor air design conditions.

Desiccant systems meet this challenge by avoiding the recirculation of indoor air that conventional systems use. Desiccant technology efficiently and effectively supplies the fresh dry air today's buildings need.

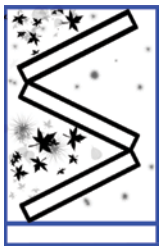
It's a simple solution to an age old problem. The active desiccant material absorbs moisture from the outdoor air stream. Then heat is applied to the desiccant to release the moisture and exhaust it from the building. This process enables the active desiccant material to continually take moisture out of the air stream providing dry air to the building without interruption.

CDI designs custom desiccant air handlers to meet unique indoor air quality requirements. We offer maximum process volumes of 1,500 to 38,000 scfm. In addition, total system integration is available, which allows you to include heating, cooling, enthalpy recovery and special filtration in a custom designed air handler.

Combine Enthalpy Heat Recovery with Active Desiccant to:

- Reduce energy costs/shift energy source
- Improve efficiency of product processing
- Create independent control of humidity and temperature
- Reduce humidity fluctuations
- Reduce or eliminate mold
- Avoid structural decay and corrosion
- Enhance indoor air quality
- Increase outside air quantities
- Improve safety and comfort

MDH Series Unit Sections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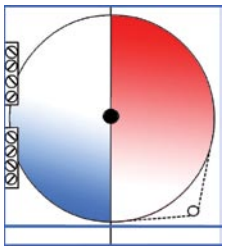
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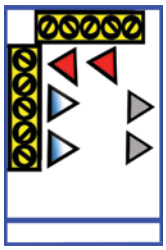
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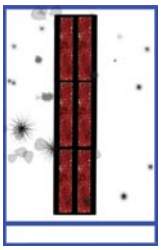
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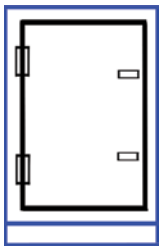
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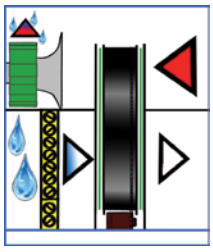
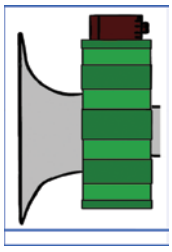

Desiccant Dehumidification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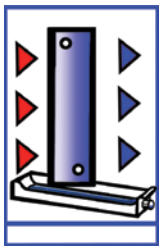
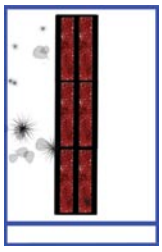

Post Cool


Post Heat


Post Filter

Dedicated Outdoor Desiccant Air Supply

The largest moisture load in many commercial and industrial buildings comes from the introduction of outdoor air. A large quantity of outdoor air is required to maintain healthy indoor air quality and meet building code requirements. Outdoor air can contain large amounts of moisture that can be difficult to control using conventional cooling based air handlers. Moisture in a facility can cause mold, mildew, microbial and viral agents and a "**sick building**."

Schools, Hotels & Commercial Buildings

By using active desiccants to centralize the control of indoor air humidity, the other air handlers in your facility can be used exclusively to control the temperature of the space. The dehumidified air provided by our desiccant air handler can actually reduce mold growth in your secondary air handlers and your entire air handling system.

Hospitals & Surgical Suites

Typically the air conditions of an operating room are controlled by the same air handling system as the rest of the hospital. In order to remain comfortable in full protective body suits and control the spread of bacteria, surgeons are requesting cooler and dryer operating room conditions than can be provided by the hospitals main air handling system.

CDI's dedicated desiccant outdoor air system (MDH) is ideal for meeting the specific quality indoor air conditions requested by surgeons by providing lower temperatures and humidity year around.

desiccant technology at work

Clean Rooms & Pharmaceutical

The stringent requirements of these applications include higher re-circulation airflow, humidity control and filtration than can be provided by the facilities main air handling system.

CDI's dedicated desiccant outdoor air system (MDH) is ideal for supplying temperature neutral dehumidified air into the large re-circulated air stream.

Industrial/Manufacturing

Condensation is a significant problem for many industrial processes where chilled water is used to remove heat from their process.

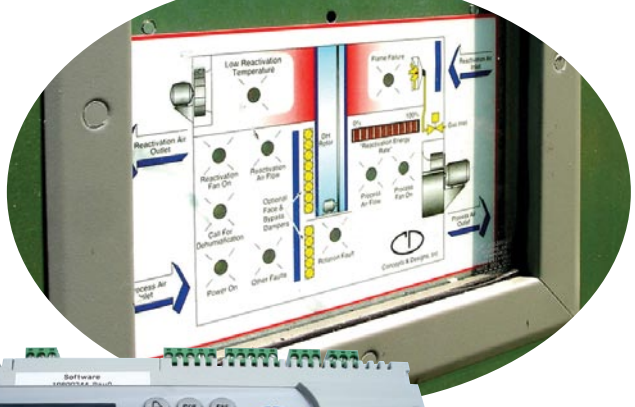
CDI's dedicated desiccant outdoor air system (MDH) is ideal for eliminating condensation, which results in higher quality parts and reduced cycle times.

Applications include:

- Industrial paint booths
- Glass laminating
- Investment casting
- Plastic injection or blowing molding

The CDI Advantage

We have selected quality components that provide you the flexibility to configure your air handler to meet every application requirement.



Microprocessor Controller

The microprocessor is able to control all unit functions including, heating, cooling, humidity, reactivation, unit alarms, and other optional functions. We make it easy for customers to interface with this microprocessor for communication with building management systems, alarming, and monitoring.

CDI's microprocessor includes a built-in user interface. The interface is an excellent tool for startup, troubleshooting, and monitoring fault status (including fault history) and unit operation. To prevent tampering, the user interface is located in the unit control panel. When better accessibility is required, we can provide an optional password protected remote user interface. In addition to the user interface each unit includes a unit mounted graphic annunciator to provide a quick assessment of unit operation and fault status.

CDI's microprocessor also allows the unit to:

- Maintain a constant reactivation burner temperature to prevent overheating irrespective of filter loading and other reactivation airflow changes.
- Minimize energy by reducing reactivation energy during part load conditions.
- Have full-rated performance capability during cool weather conditions.

The Reactivation Burner Flame Safeguard System

The reactivation burner flame safeguard system is an industry recognized Honeywell R7897 instead of a commercial or residential-style "ignition module."

Reactivation Temperature Sensors

Reactivation temperature sensors are 500° F rated platinum RTDs (Resistance Temperature Detection).

The Standard Gas Train

CDI's standard gas train is an ANSI type, and includes inlet regulator, automatic main and pilot valves and an electronic modulating valve in addition to manual safety valves.

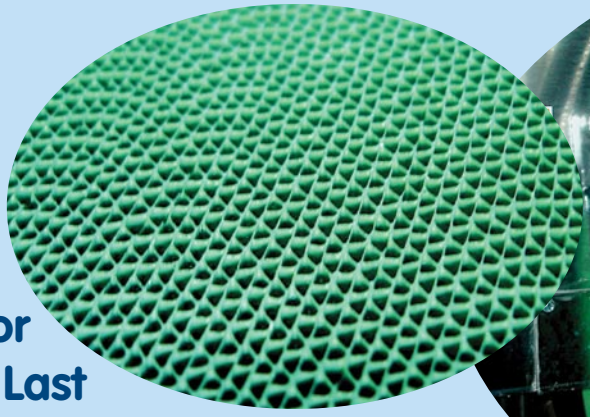
Circuitry Designed for Ease and Safety

Reduced Downtime: CDI units use a combination of circuit breaker, overload and starters for fan motor protection. This eliminates the need for spare power fuses, and saves downtime.

Simple Reset: If an upset occurs, a simple reset will bring the unit back online.

Easier Connection and Troubleshooting: Wiring to industrial terminal strips makes for easier connection and troubleshooting.

Prevent Unauthorized Access: All doors are equipped with common keyed locking handles to prevent unauthorized access.



Desiccant Rotor System Built to Last

CDI Desiccant Rotors are made of stabilized silica gel permanently bonded to a low specific-heat substrate for:

- Long-lasting dehumidification performance.
- Maximum efficiency.

CDI Desiccant Rotor Rim and Cassette are stainless steel for:

- Durability and strength.

CDI Desiccant Rotor Seals are dual-contact, Viton extruded seals that are:

- Designed to last the life of the unit.
- The most durable seal in the industry.

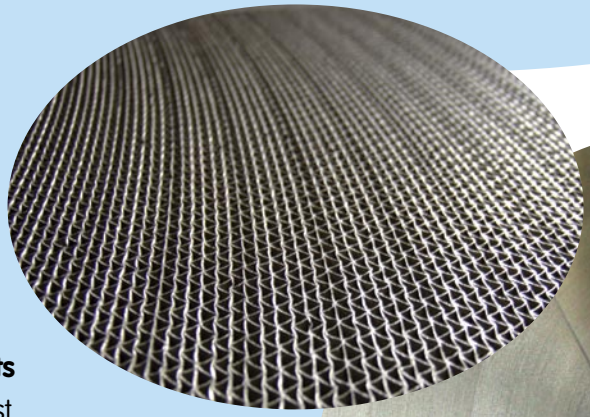
CDI Rotor Drive System is a:

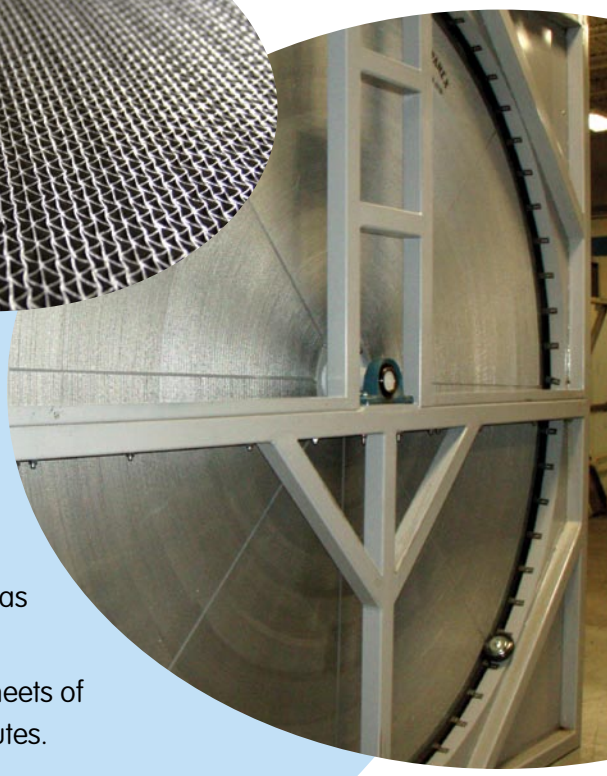
- Full-perimeter sprocket with a #40 molly chain.
- More durable drive system than any other system on the market.

CDI Standard Filters ensure a clean desiccant rotor with:

- Minimum 30% efficient industrial pleated-style filters.
- Optional additional filtration.

The Unique Advantages of CDI Enthalpy Heat Recovery Rotor





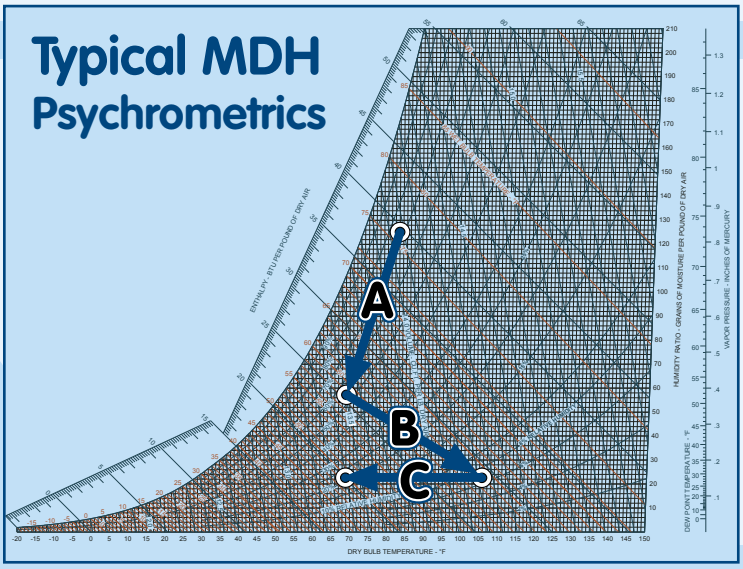
The CDI MDH Enthalpy Heat Recovery Rotor:

- **Lowest co-adsorption coefficient in the industry reducing carryover of air pollutants including odors** because rotor uses the latest generation ion exchange resin as the desiccant to adsorb water molecules. Even lower than 3A molecular sieve.
- **Prevents growth of mold and mildew** because rotor has an anti-microbial treatment.
- **Most efficient heat transfer** because rotor is made from aluminum
- **Dramatically increases heat exchange surface life** because rotor has anticorrosion coating.
- **Provides years of service** because rotor is wound with interleafed sheets of corrugated and flat material to prevent nesting or collapsing of the flutes.

MDH Series Capacity Data

Basic Unit Model #			MDH-130	MDH-138	MDH-142	MDH-148	MDH-160	MDH-168	MDH-176	MDH-185	MDH-196	MDH-1108
Enthalpy Rotor Diameter		(in)	42	54	60	66	78	84	90	108	120	138
Desiccant Rotor Diameter		(in)	30	38	42	48	60	68	76	85	96	108
Maximum Outside, Return and Exhaust Air		(SCFM)	3000	5000	5800	8300	12000	15000	18000	24000	29000	38000
Maximum Supply Static Pressure		(in W.C.)	2	2	2	2	2	2	2	2	2	2
Maximum Return/Exhaust Static Pressure		(in W.C.)	1	1	1	1	1	1	1	1	1	1
Process Air	Heat Recovered *	MBH	189.2	315.3	365.8	523.5	756.8	946.0	1135.2	1513.6	1828.9	2396.5
	Moisture Removed **	lb H2O/hr	66.9	111.5	129.4	185.1	267.7	334.6	401.5	535.4	646.9	847.7
	Based on inlet conditions of 83 db and 125 gr/lb process and 65 db and 30 gr/lb exhaust * by enthalpy recovery ** by active desiccant											
Electrical Requirements (by reactivation type)												
Direct Fired Burner or Steam Heating Coils	200V 3PH 60Hz	(FLA)	30.7	40.0	51.8	80.7	99.4	115.2	122.8	200.2	212.8	242.1
	230V 3PH 60Hz	(FLA)	27.1	35.0	44.8	70.0	86.2	99.8	106.3	170.9	181.9	206.9
	460V 3PH 60Hz	(FLA)	13.6	17.5	22.4	35.0	43.1	49.9	53.1	85.4	90.9	103.4
	575V 3PH 60Hz	(FLA)	12.0	15.7	20.6	30.7	38.8	44.3	46.9	78.5	85.4	95.8
Electric Resistance Coils	200V 3PH 60Hz	(FLA)	Consult Factory				N/A	N/A	N/A	N/A	N/A	N/A
	230V 3PH 60Hz	(FLA)	Consult Factory				N/A	N/A	N/A	N/A	N/A	N/A
	460V 3PH 60Hz	(FLA)	86.5	143.2	168.2	242.2	333.4	Consult Factory			N/A	N/A
	575V 3PH 60Hz	(FLA)	70.3	116.2	137.2	196.5	271.0	Consult Factory			N/A	N/A
Reactivation Air Data												
Max Reactivation Air Volume		(SCFM)	791	1315	1529	2183	3132	3977	4886	6368	7670	10022
Max Reactivation Power	Direct Fired Burner	(Mbh)	216	359	417	597	862	1078	1293	1724	2083	2730
	Electric Resistance Coils	(kW)	58	100	116	166	231	Consult Factory			N/A	N/A
	Steam Heating Coils***	(lb H2O/hr)	249	417	489	705	913	1166	1448	1868	2238	2959
	*** Based on 100 psi steam pressure											
Max External Static Pressure		(in W.C.)	1	1	1	1	1	1	1	1	1	1

Typical MDH Psychrometrics



Typical MDH Unit Psychrometrics - Summer

A. Outside air is cooled and moisture removed by enthalpy heat recovery.

B. Additional moisture is removed by desiccant dehumidification to provide air that is generally below 30 degree dewpoint, some sensible heat is added.

C. Optional - Air is post cooled to be delivered somewhere between room neutral or a further reduced temperature to offset room loads.

Our standard unit construction is G-90 galvanized steel, double-wall, and insulated. It is very rugged, and includes airtight, gasketed access doors to components. Each unit is ETL listed and approved as a unit.

ETL-C, ETL and CE Rated

Rev 3/08

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