Low Dewpoint for Dry Rooms and Environmental Chambers

Solutions for Indoor Air Quality
Concepts and Designs, Inc.

Concepts and Designs, Inc. (CDI) originated in 1989 in Owatonna, Minnesota. CDI provides customers with a broad array of custom HVAC options. Years of HVAC industry experience established the foundation for today's thriving company.

CDI designs and manufactures custom air handling systems for facilities as well as chambers or rooms that need very specific environments. Products include desiccant dehumidification equipment, custom air handling units, and cooling and heating products.

Our products offer indoor air quality solutions for numerous markets: Food Processing, Ice Arenas, Wastewater Treatment Plants, Pharmaceuticals, Automotive, Rental, Healthcare, Aviation, and all types of facilities requiring controlled air climates. We have provided climate control products to numerous countries including Canada, Mexico, Russia, and China.

Our products are designed utilizing internally developed "Climate by Design" software combined with 3D Solid Modeling. All products are manufactured in the same facility.

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

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

Applications for Lithium-Ion Battery Rooms, Environmental Test Chambers, and some Industrial Processes require very low moisture conditions. Normally expressed in dewpoints, these applications range from -40F (-40C) to -76F (-60C).

CDI’s dedicated desiccant air-supply units provide ULTRA low-humidity discharge conditions necessary to maintain an appropriately dry environment.

At the heart of the system is the solid desiccant rotor. Depending on the application there is a choice between either a Silica Gel desiccant or a special synthesized zeolite. The rotor is manufactured using a ceramic fiber paper in which the desiccant is firmly fixed and impregnated by means of special chemical treatment and inorganic binders. This creates a strong physical structure and non-shedding of the adsorbent.

The rotor adsorbs moisture from process air. The moisture is taken out of the rotor by a reactivating airstream. This process enables the rotor to continually take moisture out of the airstream without interruption.

CDI offers units with air volume range of 1,500 to 47,000 scfm. Units are designed with custom configurations of standard components to meet unique project requirements. Total system integration is available.

Desiccant Unit Configurations May Include:

- Outside air pre-treatment
- 1st stage moisture removal with a pre-cooling coil
- Intermediate cooling
- Gas, electric, indirect fired gas or steam reactivation utilities
- Silica gel or zeolite desiccants
- Post cooling
- Post heating
- HEPA final filtration

Configurable Unit to Your Application
Ultra Low Dewpoint Desiccant Units

When moisture is not tolerable in your application the CDI low dewpoint desiccant unit offers a continuous robust solution. You can control water vapor from outdoor air, infiltration, and internal room gain. Water molecules laden in the air are adsorbed by hydroxyl groups inside the micropores of the desiccant. Adsorbed water molecules are ejected from the system by the heated reactivation air. The desiccant rotor turns from the adsorption zone to the desorption zone in a continuous process providing constant dry air to offset any room moisture gain.

Lithium-Ion Battery Dry Rooms

For this very sensitive battery manufacturing process, the use of a desiccant-based dehumidifier is essential. Pure lithium reacts violently with water. Even normal atmospheric levels of relative humidity cause quality problems in the manufacturing process.

Environment Test Chambers

Environmental Test Chamber environments can range from -40F upward to 200F. When temperatures are reduced moisture can wreak havoc on mechanical systems. The desiccant drying process can eliminate those issues as well as provide the variable RH control range that is desired.

Our units include all the mechanical systems including: heating, cooling, humidification, dehumidification and filtration to reach variable conditions anywhere on the Psychrometric Chart.
Proven Technology

Installed in units around the world CDI offers proven Silica Gel and Zeolite Desiccants fully integrated into complete systems. From the R & D lab to proven installations this is a technology you can count on.

Continuous product improvement processes and customer feedback have allowed us to design and implement robust mechanical systems that deliver.

Complete Factory Testing and Service

Equipment is fully inspected and tested before leaving the factory. This gives you the assurance of performance from the first day of operation.

Our factory start-up and commissioning team is on site to assure your system completes the job. Service is available 24/7 to keep things operational. We also offer Critical Customer Care packages that include quarterly visits for preventative measures.
The Complete Unitary Dry Room for R & D and Preproduction

Get the complete room from the factory to your facility. The room includes:

- Air Lock Vestibule with Doors
- Anti-Static Flooring
- Air Distribution System
  - Internal Duct
  - Return and Supply Air Grills
- Electrical Systems
  - Circuit Breaker Panel
  - GFI Outlets
  - Lighting

The Low Dewpoint unit and the Air Lock are shipped separately from the Dry Room. The low dewpoint unit can be located indoors or outdoors. Aesthetic options are available.

Benefits of the Unitary Dry Room

Tax Benefits - The complete system is treated as a capital machine, not a leasehold improvement.

Portability - The room can be moved to the eventual location of the production facility.

Speed to Market – The dry room, the systems, and the design are complete. Factory manufacturing and testing is controlled and predictable.

Factory-Fabricated Complete Unitary Dry Rooms

CDI Unitary Dry Rooms include the operational, temperature and moisture controls. The room is provided with a programmable user interface display with LCD. Temperature and Humidity set-points are adjustable remotely via user interface. All necessary Dry Room temperature and humidity sensors are included to provide a completely packaged solution to satisfy the needs of the application. Wiring to industrial terminal strips makes for easier connection and troubleshooting.
Desiccant Rotor System Built to Last

Stabilized Silica Gel is permanently bonded to a low specific-heat substrate for long-lasting dehumidification performance at maximum efficiency. The desiccant rotor rim and cassette are stainless steel for durability and strength.

CDI desiccant rotor seals are dual-contact, Viton extruded seals, designed to last for the life of the unit. This is the most durable seal in the industry.

Efficient industrial pleated-style Merv 8 filters are provided to ensure a clean desiccant rotor. Additional filtration is available.

A full-perimeter sprocket with a #40 molly chain drives our desiccant rotor making it more durable than any other system on the market.

No Through Metal NTM® Construction

Both the Low Dewpoint Unit and the Dry Room are manufactured using our unique NTM® technology. The complete inner and outer walls are erected in place and THEN completely filled with urethane foam. This technology assures no leakage or infiltration whatsoever even at these extreme vapor pressure and temperature differentials. There is no metal to metal contact or metal thermal bridging, so no condensation or moisture leakage can occur. 2 ½” R-15 panels are standard on the Low Dewpoint Unit and 4” R-24 panels on the Dry Room. Options for 6” R-36 panels are available for extreme temperature differentials in Environmental Test Chambers.
Three Sizes of Unitary Dry Rooms

ETL-C, ETL and CE Rated

DRY ROOM DIMENSIONS

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 PERSON</td>
<td>264&quot;</td>
<td>174&quot;</td>
<td>246&quot;</td>
<td>160&quot;</td>
</tr>
<tr>
<td>2 PERSON</td>
<td>192&quot;</td>
<td>102&quot;</td>
<td>230&quot;</td>
<td>144&quot;</td>
</tr>
<tr>
<td>1 PERSON</td>
<td>144&quot;</td>
<td>54&quot;</td>
<td>230&quot;</td>
<td>144&quot;</td>
</tr>
</tbody>
</table>

2100 Park Drive NW
Owatonna, MN  55060
phone: 507.451.2198
fax: 507.451.1177
website: www.cdihvac.com
email: sales@cdihvac.com