



Drying and Curing Chambers

www.darwinchambers.com

St. Louis, MO

WALK-IN DRYING ROOMS: DIY and PRO MODELS



Darwin Chambers manufactures and installs drying rooms that can control temperature, air flow, additive humidity, and dehumidification at programmed (ramped) levels. This enables lot to lot consistency whether the drying happens in humid, coastal areas or dry, high altitude areas. Product can also be stored long term with precise levels of humidity to prevent mold or brittleness.

PFTCU: Darwin Chambers utilizes a proprietary method of cooling, the PFTCU, (precision fluid temperature control unit) to precisely control temperature. Unlike typical refrigeration units, the PFTCU enables fast replacement (30 minutes) of all cooling components as well as redundancy when ordered as such. Our rooms that include an optional redundant refrigeration system allow uninterrupted operation upon a refrigeration failure. The room does not need to be taken out of service during repair, as the failed system can be isolated and serviced with no impact upon the chamber operation.

Desiccant Dehumidification: Dehumidifiers are required wherever there is a need to lower the humidity level to prevent corrosion, mold growth and condensation. Their operation is simplistic yet extremely effective and reliable, and extremely ideal for cannabis drying via moisture extraction rate. Desiccant dehumidifiers perform exceptionally well when used in cooler climates, or when a low dew-point, deep drying or low humidity levels are required.

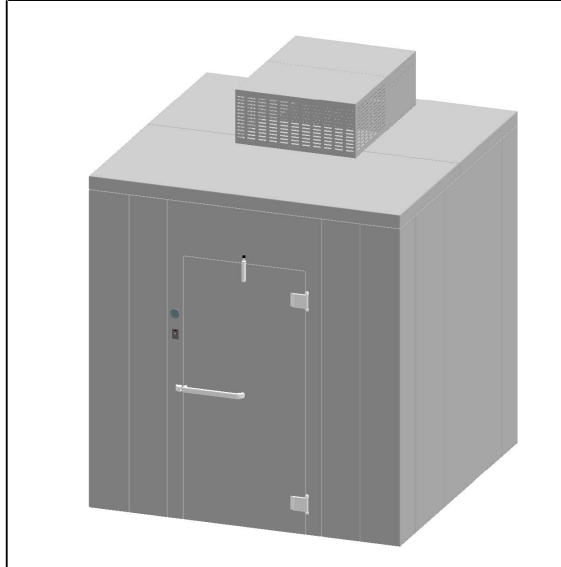
Ultrasonic Humidifier: Our systems add humidity through an ultrasonic vapor generator. The customer can turn it off and on in mere seconds. It doesn't generate any heat and doesn't overshoot or continue to add humidity past the set point. It also doesn't collect mineral scale.

Airflow Systems: Our rooms can be designed with an airflow system meant to handle any type of drying method, whether it's turbulent with hang-drying carts or horizontal with tray-drying racks.

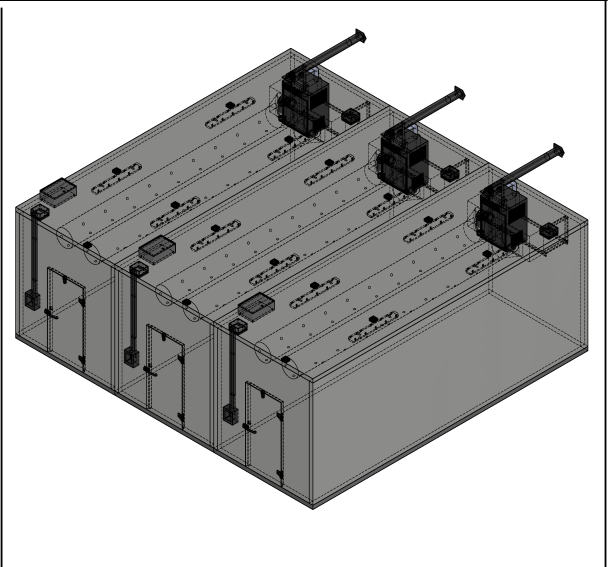
FDA/ICH/GMP Guidelines: Our rooms are routinely used for GMP studies and conform to the international guidance documents. They are also NSF, food grade safe.

WALK-IN DRYING ROOMS: DIY and PRO MODELS

DIY Model (Do it yourself)



PRO Model (100% Turn-key)



Performance	DIY MODEL	PRO MODEL
Installation	By Customer	Darwin Technicians
Temperature Range	18° C to 21° C	15° C to 27° C
Temperature Control at Sensor	N/A	± 0.3° C
Humidity Range	45% as limited by a 40°F dew point	45% to 65% RH (can be custom)
Humidity Range at Sensor	±3%	± 2.0% RH
Moisture Removal Rate (ppd)	70 PPD (APPROX) - as limited by a 40°F dew point	Custom Moisture Removal Rate
Exterior Dimensions	7'9" x 7'9" x 8'2"	Custom Sizes
Interior Dimensions	7'1" x 7'1" x 7'10"	Custom Sizes
Exterior Finish	26ga acrylic-coated stucco galvanized steel	Stucco White Galvalume
Interior Finish	26ga acrylic-coated stucco galvanized steel	Stucco White Galvalume
Door Size	36" x 78"	Custom Sizes
Floor or Floorless	Floorless	Floorless on level epoxy coated concrete
Controller	Integrated controller with cooling unit	Touchscreen Microprocessor
Temperature Sensor	Integrated sensor with cooling unit	NIST-Traceable 100 OHM Platinu RTD
Humidity Sensor	Integrated sensor/ controller with dehumidifier	Rotronic HC2A-S 0.8% RH
Ventilation Rate	N/A	Microprocessor controlled/ user adjustable
Alarms	N/A	Temp/Rh alarms with remote output
Cooling System	Direct expansion 0.75hp placed on top of chamber	PFTCU (or custom project design)
Humidifier	N/A	Ultrasonic humidification system
Dehumidifier	Refrigeration based dehumidifier to be placed inside the chamber	Electric heat regenerated desiccant dryer
Merv Filtration	Merv 11 filter at dryer inlet	Custom design
Carbon Filtration	N/A	Custom design
Lighting	Loosely shipped incandescent bulb-wiring by customer	Vapor-proof LED lighting
Utility Requirement	208-230V/1PH/20A (1 circuit) for cooling unit 120V-20A (1 circuit) for dehumidifier and lights Will require drainline for cooling unit/ dehumidifier (refer to manual)	N/A

North America Warranty (Pro Model): 2 Years, All Parts; 1 Year, Labor; 3 Years, Compressor; 10 Years, Panels

International Warranty (Pro Model): 2 Years, All Parts; 1 Year, Labor; 2 Years, Compressor; 5 Years, Panels

SERVICES - QUALIFICATIONS - PROCESS VALIDATIONS



We understand the critical role that IQ/OQ/PQ will soon have in your regulated industry, which is why we use extremely precise calibration standards. The use of these standards will ensure that your instruments are calibrated to a standard (NIST National Institute of Standards and Technology), in order to meet or exceed manufacturer's specifications. All Darwin personnel performing instrument calibrations will be trained on the most recent revision of company calibration Standard Operating Procedures (SOPs).

What Services Does Darwin Chambers Offer?

The Installation Qualification (IQ) is utilized for providing documented verification that all key aspects of the design, procurement, and installation adhere to the design intention.

The Operational Qualification (OQ) is utilized for providing documented verification that the systems and subsystems perform as intended at all anticipated operating ranges (normally performed with an unloaded and simulated load chamber).

The Performance Qualification (PQ) is utilized for providing documented verification that the process does what it is intended to do, in the correct and anticipated manner (normally performed with either a simulated or actual product load in the chamber). The PQ is subsequently tested for the duration specified, and includes a door opening recovery demonstration. After completion, the thermocouples and RH sensors receive 3-point calibration verifications. The data (max. and min.) are collected and presented using the Kaye Qualification Report and Qualification Summary Report. Any deviations encountered during testing are documented in the protocol with an approved deviation report and mentioned again in an executor's summary report.

The Process Validation (PV) is utilized for providing documented verification that testing was performed several times to find out the constant rate of the process being validated. This entails a loaded chamber with repetitive testing involving both moisture content and relative humidity sensors.

A Kaye Validator is used exclusively for execution of our qualification testing and demonstrations. Prior to the execution, all thermocouples receive a 2-point calibration and a mid-point verification, and all Relative Humidity sensors used for data collection receive 2-point calibration and customer set-point verification. The chamber is then tested for the duration specified in the OQ (24-Hours, standard).

Validation/Qualification deliverables include: The completed protocol and executor's summary report. Qualification data is reported in both table and graphical form in the executor's summary, in order to visually display all results.

Free Technical Support: In addition to the Operations Manuals, Darwin Chambers offers free technical support on its products. Please use our support service prior to requesting an RMA or contacting a third party service provider. Darwin Chambers' free technical support is available by phone, video call, fax, or email.