DARWIN CHAMBERS

Drying and Curing Chambers

www.darwinchambers.com

St. Louis, Missouri

2945 Washington Ave. St. Louis, MO 63103
877-783-6774 | sales@darwinchambers.com
www.darwinchambers.com

Reach-in DRYING CHAMBER: MJ034 SERIES

Benefits of Controlled and Stable Drying

Generally, it is recommended to keep the drying temperature between 16 and 21°C because many terpenoids (molecules that are partially responsible for the psychoactive effects but also largely responsible for the odor of the plant) evaporate at temperatures beyond 21°C. Non-programmed drying humidity levels should generally be between 45-55%. Higher humidity levels are associated with mold. Lower humidity levels tend to dry the products too quickly. If the plant material dries too quickly, some of the chlorophyll will fail to be converted which will result in a sub-optimal taste and a harsher smoke when combusted and inhaled.

While some customers will follow the above guidelines, others will want to program increased drying at some times and/or more humidity toward the end of drying using the microprocessor's programming features.
Stable temperature preserves cannabinoids well. Low light levels are also important for proper drying of grown plants. Darwin Chambers offers options to control light levels along with many other chamber options including: data loggers, chart recorders, shelving and curing racks.

Cabinet Construction: Standard model features powder-coated door, front, and sides. Interior has 304 stainless steel on door liner, top, bottom, back and sides. Back-wall plenum is included to ensure airflow uniformity.

High-Density polyurethane insulation: Entire cabinet structure and doors insulated using foamed-in-place CFC free polyurethane foam.

Doors: Positive seal, self-closing doors (gravity cam-lift) with 120 degree stay open feature. Door gasket removal and installation is tool-less. Glass door models feature double pane, "Low-E" glass.

Controls: Standard controllers for the MJ034 Series are manufactured by Autonics and are ideal for drying chambers.

Refrigeration System: Unsurpassed temperature control through continuous refrigeration bypass system with top-mounted condensing unit.
The evaporator is epoxy coated at the time of manufacture to eliminate the potential of corrosion.

Dessicant Dehumidifiers: 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.

Moisture Removal Rate: The MJ034 model is equipped with a moisture removal rate of 22ppd with optional increased custom rates available.

Filtration: Multiple filters are included. All intake air is filtered. Filters are also used inside the chamber to prevent plant debris accumulation on fans and evaporator coil. Additional filtration options are available.

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.

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

North American Warranty: 2 Year Parts; 1 Year Labor; 3 Year Compressor
International Warranty: 2 Year Parts; 1 Year Labor; 2 Year Compressor

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Performance	Standard	Optional
Temperature Range	12° C to 27° C	-5° C to 70° C with Optional Defrost
Ambient Temperature	21° C ± 3° C	Available
Temperature Control	± 1° C	Available
Control Resolution	0.1° C	Available
Temperature Sensor	NIST Traceable PT100 Class A RTD	Available
Humidity Range	45% to 65% RH	2 to 95% @ 22° C
Humidity Control	± 3%	Available
Control Resolution	0.1%	Available
Humidity Sensor	NIST Traceable Rotronic HC2A-S	Other or Custom

Control System	Standard	Optional
Controller	Fuji PXF4 (PID - Fuzzy Logic)	West EC-44, Future Design Touchpad, Watlow, Allen Bradley
Control Readout	Actual and Set-Point Values	Trending, Duty Cycle
Calibration Corrrection Capability	Standard 0.1 Resolution	Available
Alarm	Audible and Visual	Available
Alarm Type	Deviation in 0.1° C or 0.1% RH with Delay	Absolute 0.1 Resolution with Delay
Remote Monitoring	Dry Alarm Contact, RS 485, & Analog Output	Ethernet
Password Protection	Numeric	Numeric, Alpha Numeric
Audit Trail	N/A	Available with Future Design Model, VTS
Moisture Removal Rate	N/A	N/A

Construction	Standard	Customized Option
Exterior	Powder coated 20ga galvanized steel	Stainless Steel
Interior	Stainless Steel	Stainless Steel
Shelving	3 Stainless Steel Shelves, Supports Up to 150 lbs per Shelf of Evenly Distributed Weight	Stainless Steel, Chrome Plate or Custom
Casters	2.75" Total Weight Capacity is 300 lbs per Castor, Not Including the Weight of the Chamber	5" Casters or Seismic Legs

Capacity & Dimensions	US Standard	Metric
Interior Capacity	29.58 ft^3	837.6 liters
External Dimensions	34"W x 35"D x 78"H	86.36cm W x 88.9cm D x 198.12cm
Internal Dimensions	29.5"W x 30"D x 63.375"H	74.93cm W x 76.2cm D x 160.973cm H
Shelf Dimensions	28.75" W x 26" D	54.61 cm W x 66.68 cm D
Crated Weight	420 lbs	191 kg

Electrical	North America	International
Voltage	115 / 60 x2	230 / 50 / 1
RLA	7amps chamber - 10amps dryer	2.6 With Step Down Transformer
Cord Length	9 ft	2.74m

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WALK-IN DRYING ROOM: PRO MODEL

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.

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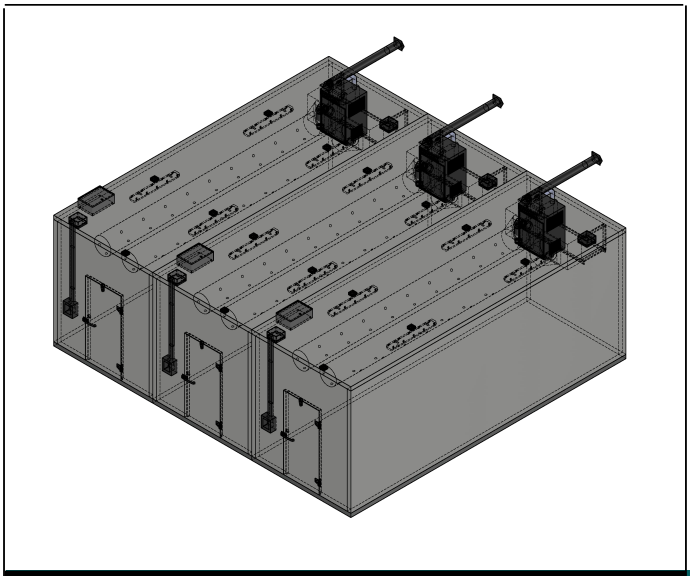
WALK-IN DRYING ROOM: PRO MODEL

PRO Model
(100% Turn-key)



Performance	PRO MODEL
Installation	Darwin Technicians
Temperature Range	15° C to 27° C
Temperature Control at Sensor	± 0.3° C
Humidity Range	45% to 65% RH (can be custom)
Humidity Range at Sensor	± 2.0% RH
Moisture Removal Rate (ppd)	Custom Moisture Removal Rate
Exterior Dimensions	Custom Sizes
Interior Dimensions	Custom Sizes
Exterior Finish	Stucco White Galvalume
Interior Finish	Stucco White Galvalume
Door Size	Custom Sizes
Floor or Floorless	Floorless on level epoxy coated concrete
Controller	Touchscreen Microprocessor
Temperature Sensor	NIST-Traceable 100 OHM Platiun RTD
Humidity Sensor	Rotronic HC2A-S 0.8% RH
Ventilation Rate	Microprocessor controlled/ user adjustable
Alarms	Temp/Rh alarms with remote output
Cooling System	PFTCU (or custom project design)
Humidifier	Ultrasonic humidification system
Dehumidifier	Electric heat regenerated desiccant dryer
Merv Filtration (inlets/exhausts)	Custom design
Carbon Filtration	Custom design
Lighting	Vapor-proof LED lighting

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

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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 comple-tion, 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 consistant 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 collec-tion 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.