

CANNABIS PRODUCTION

Precision Controlled
Environments

CONVIRON[®]

Conviron provides a portfolio of pharmaceutical-grade controlled environments customizable for each stage of cannabis production – **from mother plant to dried bud** – which provides growers the control and repeatability needed to maximize product quality and through-put in a commercial-scale facility.

Precision Control. Consistent Results.

Our technology provides commercial-scale cannabis growers an unmatched level of environmental control that enables them to develop, refine and repeat specific growth conditions to produce specific plant properties in every harvest.

Our equipment creates and sustains precise uniform growth conditions that result in consistent plant development throughout each room, streamlining workflow, reducing waste and driving more value from every crop cycle.

Turn-Key Solutions. High Performance Facilities.

With 50 years of experience supplying controlled environments for plant growth, Conviron provides custom turn-key solutions for cannabis production. We design, manufacture, install, commission and service growth rooms that are fully outfitted with lighting, air handling, humidity control, carbon dioxide management, irrigation and fertigation – all centrally controlled by an Argus control system.

We collaborate with clients and their architects and engineers to optimize layout within a facility. We design and then communicate all equipment interface and services requirements for the growth rooms, such as power supply and chilled water, to ensure seamless integration with the building's electrical and HVAC systems. By delivering a complete growth room solution – with warranty – Conviron becomes the central point of accountability for the most critical areas of a high performance facility.



Preserving Genetics

Mother plants require constant environmental conditions to sustain a healthy, vegetative state in order to provide healthy cuttings for clones over periods of months or years. Depending on the grower's humidity requirements, the **Conviron Growth House™** or our **BDW** or **GR** series of walk-in room provide uniform conditions suitable for long-term preservation of mature mother plants.

50-70% RH

65-80°F

400-500 μmol

↓ Airflow

Walk-In Mother Room



Controlled Environments for Every Stage of Cannabis Production

Every grower has a unique approach to cannabis production. Conviron works closely with each client to understand their requirements and develop a solution by customizing proven designs and integrating specialized technologies.



Propagating Plants

The clone is the most vulnerable stage of the cannabis plant's development, requiring high humidity and consistent temperatures to prevent excessive drying of young roots during propagation. Conviron offers high capacity, multi-tier growth chambers, which are well-suited for numerous clone trays. Additive humidity systems provide high humidity levels with moderately low light.

80-90% RH

70-80°F

300 μ mol

→ Airflow

Clone Propagation Chamber



Tissue Culture

Tissue culture offers growers the ability to tightly control and rapidly multiply genetics. Using tissue culture techniques, growers can culture high numbers of plants in small areas, allowing high volume propagation and management of numerous strains. Conviron's multi-tier tissue culture rooms are designed to provide controlled upward airflow to minimize condensation in petri dishes and other culture containers.

60-70% RH

70-80°F

150 μ mol

↑ Airflow

Multi-tier Tissue Culture Room



Managing Vegetative Growth

To establish a healthy root zone and sustain vegetative growth, consistent temperature, humidity and watering are required. Conviron's **MTPC** walk-in room with additive humidity provides a larger scale room for short plants in pots or flats on multiple tiers. Lighting over each shelf and horizontal airflow provide uniform growth conditions while optional irrigation and nutrient systems nurture young plants.

50-70% RH

70-80°F

300 μ mol

→ Airflow

MTPC Series Veg Room





Inside a Conviron Growth House™



Developing Blooms

During the final vegetative growth stage, cannabis plants require high light intensities and longer daylight cycles to establish desired plant mass and root base prior to blooming. Once flowering is triggered by shortening the light cycle and reducing temperature, flowers start to develop resins containing THC and CBD, during which time humidity must be kept low to prevent mold from forming on the buds.

The **Conviron Growth House™** provides the precision of a **growth** chamber with the capacity of a **greenhouse** to deliver a reliable and cost-effective environment for vegetative growth and flowering of cannabis at a commercial scale, offering an ideal combination of lighting, temperature, humidity and CO₂ control. High pressure sodium and ceramic metal halide lighting provide 800µmol of light to the plant canopy. When configured with an active dehumidification system, the Growth House controls the environment down to 40% RH to prevent mold formation on the buds.

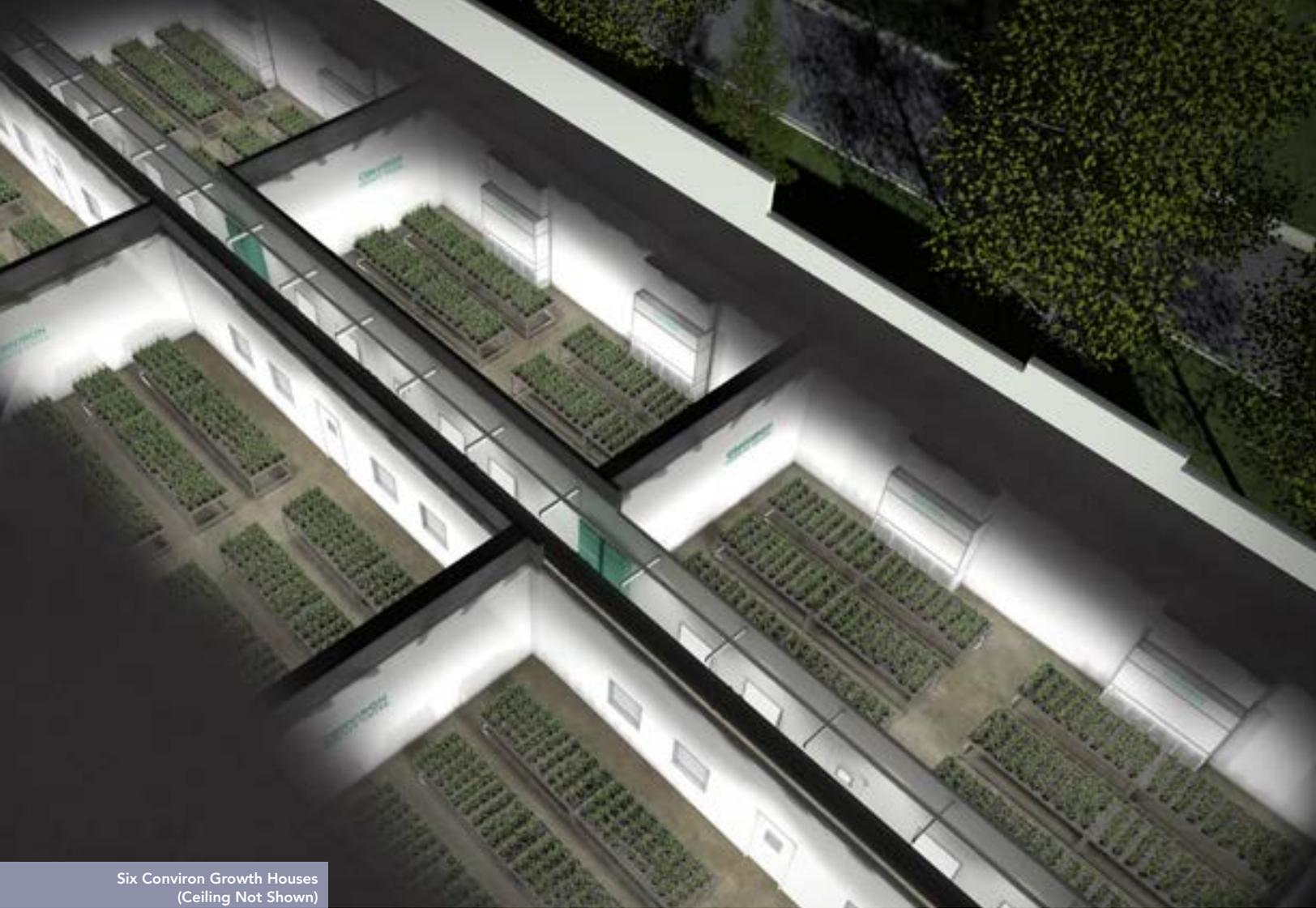
40-60% RH

65-80°F

800 µmol

↓ Airflow

The Growth House is uniquely designed to the client's specifications. Installed inside a facility or stand-alone outside, insulated panel walls provide 24/7 containment of the environment and protection from outside elements and intrusions.



Six Conviron Growth Houses
(Ceiling Not Shown)



Drying & Curing

High ventilation, low humidity, and slightly lower temperature are required during the drying stage to reduce the water content of cannabis buds, remove unwanted pigment and chlorophyll, and prevent mold formation.

Conviron's line of walk-in rooms equipped with active dehumidification offer precise control of the drying environment, which is especially important for growers that adjust the rate of drying over time. With horizontal airflow for effective circulation and controlled drying, these mid-sized rooms can be configured for a variety of drying rack systems.

45-55% RH

60-70°F

Utility Light

→ Airflow

Our higher capacity drying rooms are designed with downward airflow to provide uniformity of environmental conditions throughout the larger space.

Walk-In Drying Room





Advanced Control Systems by Argus

An advanced control system is critical to translate the cannabis grower's expertise and growth plans into action accurately and reliably. Acquired by Conviron in 2013, Argus has over thirty years' experience specializing in the design and manufacture of integrated control systems for greenhouses and plant growth rooms and chambers. Having already designed and installed control systems for cannabis production, Argus offers proven solutions for comprehensive central management of entire production facilities, including growth rooms and building systems. In addition to precision temperature and humidity control, Argus offers the cannabis producer:

- Optimized photosynthesis and THC production with sophisticated programs for managing light intensity, photoperiods and CO₂
- Precision hydroponic feed recipes tailored for each plant using advanced irrigation scheduling and the Argus Multi-Feed nutrient injection system
- 24/7 monitoring of all equipment and facility conditions with local and remote alarm annunciation and custom email alerts to allow rapid response to alarms
- Monitoring of crop conditions and development with integrated camera imagery
- Tracking of all production parameters over time with extensive data acquisition and graphing capabilities
- Secure remote system access via LAN/Internet
- Comprehensive remote service and support provided directly by Argus



Lighting Solutions

Optimizing Spectrum and Energy-Savings

The selection of lighting depends on the grower's requirements for light spectrum and energy-usage. Most Conviron plant growth rooms and chambers have primary and secondary lighting or a mix of types – fluorescent, halogen incandescent, high pressure sodium, metal halide and ceramic metal halide, and LED – to deliver a range of intensity from 100 to 1,400 μ mol.

As an exclusive distributor for Valoya (Finland), Conviron offers continuous wide spectrum LEDs that have been developed specifically for high volume plant growth applications and can reduce energy consumption by nearly 40% compared to fluorescent T5. We can also integrate LEDs from other LED manufacturers to provide growers with their required light spectrum.

Streamlining Workflow and Improving Control

Controlled Irrigation

Conviron's automated irrigation systems eliminate the inaccuracies of manual watering of plants. "Flood and drain" systems for trays or drip systems for individual plants are available depending on the plant requirements and size of growth room.

Automated Nutrient Supply

Argus Multi-Feed injectors offer advanced fertigation capabilities including full single-element dosing options and on-the-fly delivery of multiple stock concentrates regardless of the system flow rate. The same dosing equipment is capable of delivering numerous recipes, which can be modified to suit the changing environmental conditions. Fully integrated with Argus control system, Multi-Feed injection systems enable growers to simply dial in a precision feeding program for every crop.

Space-Efficient Benching

Conviron provides various benching solutions, including rolling benches with integrated irrigation trays, expanded metal tops, or solid tops mounted on the bench. Requiring only a slight pushing force, bench tops shift laterally creating access space between adjacent benches, while maximizing growth area.

Plant Imaging

For advanced growers, phenotyping using automated plant imaging technology may be used to optimize the growth and development of certain strains. The Conviron Growth House™ is easily configured to work seamlessly with commercially available imaging systems.

Valoya AP673 LED Lighting



Argus Multi-Feed Injection System



Automated Irrigation System



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