

WHITE PAPER

GROW OP FARMS FINDS CONSISTENCY WITH CUSTOM HUMIDITY CONTROL



Spokane, Washington – Joaquin Morelli, facilities director at Washington state’s largest cannabis producer, Grow Op Farms, is always on the hunt, searching for ways to develop the most consistent, predictable growing environments.

That consistency is key – and surprises are unwelcome – when you’re producing 136,000 pounds of wet flower annually that represents hundreds of millions of dollars in revenue.

It’s for those reasons that Joaquin and Grow Op’s agriculture director, Mojave Morelli, set out to solve a longstanding challenge:

Maintaining an ideal humidity level throughout the duration of each grow cycle to create optimal, replicable environments that reduce the risks of mold and mildew growth.

“We need rooms to produce consistent environments, so I can worry about other stuff. The environment is critical, and it needs to be stable,” Mojave said.

ZEROING IN ON THE HUMIDITY CHALLENGE

Grow Op Farms, launched in 2014, is tucked unassumingly into a massive, 140,000 square-foot warehouse retrofitted for growing cannabis. The first grow rooms built, specifically Grow Room 3, were of special concern to Joaquin, because they historically had significant fluctuations in humidity levels during each grow.

To start, it’s important to understand Grow Room 3, Joaquin said. The room has produced cannabis since November 2015, and yields have been good. But given the nature of the retrofit,

air flow and humidity control have always been challenging. Specifically, it’s difficult to stabilize humidity levels during transition seasons.

“Inherently, in sealed rooms, plants are producing a lot of humidity, especially as they mature. Simply, we need to have our humidity control dialed in to promote healthy growth,” Joaquin said.

Additionally, in early 2018 the room transitioned from growing Grow Op/Phat Panda’s legendary Golden Pineapple strain to being home to Tropicana Cookies. The new strain produces dense buds that can trap moisture, putting the flowers at risk for developing mold or mildew.

“We haven’t had powdery mildew in a few years, but we see botrytis every once in a while,” Mojave said. “Typically, we see it with the big, super dense buds.”

For those reasons, Joaquin wanted to focus on Grow Room 3 to test a new dehumidifier setup, installed and designed with the help of environmental control experts. He worked with the team from Quest Dehumidifiers, a group of engineers and climate control experts who have spent years helping growers stabilize conditions in their grow rooms.

“The Grow Op team is so in tune with their grows, monitoring and tweaking every detail as needed; they definitely have a great approach,” said Clif Tomasini, business manager for Quest. “We wanted to come in and really help them fine-tune this room, with tremendous precision, so it could serve as a model for future builds.”

When the Quest team arrived at Grow Op, the first thing they did was examine the room and discuss its features with Joaquin and the Grow Op crew.

It's critical to understand a number of factors, ranging from number of plants and amount of water fed daily, to ideal temperature and humidity ranges during each stage of a grow cycle. Each affects how much dehumidification is needed to stabilize a room.



Grow Op Farms and Phat Panda have installed multiple Quest 506 units in their Spokane facility.

GROW ROOM 3: THE SPECS

<u>STRAIN</u>	TROPICANA COOKIES
<u>NO. OF PLANTS</u>	180
<u>GROW MEDIUM</u>	60% COCO 40% PERLITE
<u>GROW CYCLE</u>	63-65 DAYS
<u>WATERING</u>	100 GALLONS DAILY (FIRST SEVEN DAYS) 200-250 GALLONS DAILY AFTER THAT
<u>LIGHTS</u>	36 GAVITA 277V FIXTURES (18 METAL HALIDE BULBS, 18 HIGH-PRESSURE SODIUM BULBS)
<u>AIR FILTRATION</u>	MERV 8 FILTERS WITH UV LIGHTING IN THE DUCT WORK
<u>DUCTING</u>	RUNS ON THE EAST AND WEST SIDES
<u>CONTROLS</u>	HONEYWELL SYSTEM WITH CUSTOM DASHBOARD
<u>COOLING</u>	3 RHEEM AIR HANDLERS THAT PRODUCED 13 TONS OF COOLING
<u>AIRFLOW</u>	4-INCH WALL FANS PLACED ABOVE THE CANOPY
<u>DIMENSIONS</u>	1,135 SQUARE FEET



A Grow Op employee prepares to install the Quest 506. Overhead mounting saves space and improves air flow.

SIZING THE GROW ROOM

Prior to the new room design, Grow Op used four Quest Dual 155 dehumidifiers to manage humidity in the room. Given the size of the room and number of plants (typically about 180) the 620 pints collectively pulled daily from the air wasn't enough during vegetative and flower stages.

"We monitor our rooms obsessively and found ourselves having to run 'ambulance dehumidifiers' to certain rooms to manage spikes in moisture," Morelli said. "The approach led to an unstable environment that was often difficult to predict day-to-day as conditions changed."

"Proper sizing is one of the top issues growers face," Tomasini said. For Room 3 at Grow Op, the existing units, while efficient, weren't big enough for the number of plants being grown during each cycle. When the canopy increased in size, the Grow Op team frequently had to pull in an extra, portable dehumidifier to control relative humidity spikes.

Tomasini said every day grow light technology improves, the market matures, and growers achieve greater yields in the same space. With

more water being fed to the plants and thus more water vapor transpired, growers inevitably need more dehumidification to control moisture.

"It's a subtle, but important detail that happens when you excel like Phat Panda," Tomasini said.

Based on the feed schedule and needs of the Tropicana strain, Tomasini and engineering tech Mike Steffes recommended Grow Op use two Quest 506s. The units can pull a combined 1012 pints of water from the air daily. The larger units could efficiently manage the amount of moisture in the air and also provided redundancy critical for establishing stable environments.

"We almost always recommend growers oversize when it comes to dehumidification, but only slightly. This gives you peace of mind, should one unit need to be serviced. Additionally, it makes your units more efficient, because they don't have to work as hard," Tomasini said. "Also, each strain requires different levels of humidity control – the 506s give the Grow Op team flexibility."

MAKING PLACEMENT A PRIORITY

With the AC and ventilation duct work running along the east and west walls of Grow Room, Quest decided to place the two 506 units in opposite corners on the north and south walls.

Each unit was placed about 6 inches from the ceiling and 12 inches from the wall, with the intake facing the plants. The goal was to improve air flow throughout the room, thus avoiding microclimates, or pockets where moisture could hide, Tomasini said. Over the course of one morning, the Grow Op and Quest teams, with the help of a hydraulic lift, had the two units installed and operational.

“We really like the idea of hanging dehumidifiers from the ceiling and pioneered this concept many years back. In the early years, growers would place dehumidifiers at ground level blowing directly on the plants, Tomasini said. “Not only is it inconvenient to place equipment in your working space, the dry air can severely damage product, and the most saturated air is above the canopy, meaning your dehumidifiers work best here.”

Grow Op, like many growers, prefers a modular approach to their room setups. Each strain is different and environments change. When a little extra drying is needed, portable dehumidifiers like the Quest CDG 174 are designed to setup and tear down quickly, move easily, and do not blow ultra-dry air directly on your plants.

“Different strains require different conditions at different times,” Mojave said. “Having modular dehumidification means we can easily keep up with these changes in environments.”

STABLE GROW ROOM ENVIRONMENT – ACHIEVED

The Grow Op agriculture team almost immediately noticed results after loading the first group of plants into the room in late February 2018, and



The Quest installation team fine tunes a 506 dehumidifier at Grow Op Farms.

the units pulled more water from the air than expected, Joaquin said.

Only a slight tweak was needed to reach near perfect conditions. Grow Op techs rotated one of the units to prevent the exhaust from the 506 from blowing directly onto a temperature sensor in a vent. The change, which came after period 2, produced ideal, replicable results during the vegetative, flowering and late flowering stages.

That consistency is what Mojave and the other Grow Op cultivators crave. With the 506s, they’ve been able to produce some of the most stable environments to date, Joaquin said. Since the installation the room has easily maintained target relative humidity levels during veg (60 percent), flower (55 percent) and late-flower (50 percent) stages.

The biggest test, as is often the case, came during night cycles. Joaquin said the numbers were ideal during the grow, and that the data reflected optimal lights-off conditions. Additionally, the units have needed zero maintenance beyond routine filter changes after each grow cycle.

And although Grow Op hasn't had a powdery mildew or bud rot outbreak in years, it's always a concern when working with strains such as Tropicana Cookies that produce dense buds. Grow Room 3 has shown no signs of disease since pairing the 506s with Grow Op's stringent infection control process.

“That type of control is critical for consistent results,” Mojave said. “The 506s, coupled with Quest’s expertise in the cannabis industry, has really helped us find that sweet spot when it comes to humidity control.”



Grow Op Farms used two Quest 506 units (pictured) to stabilize relative humidity levels in Grow Room 3, where it was historically difficult to manage moisture in the air.

GROW OP FARMS

ABOUT

Grow Op Farms is the largest cannabis producer in Washington state, producing more than 130,000 pounds of wet flower annually. Well known for its popular brands, including Phat Panda, Grow Op Farms consistently produces premium, high-grade cannabis in an indoor facility that houses production, post-harvest and processing.

HEADQUARTERS

SPOKANE, WASHINGTON

FOUNDED

2014

CEO

ROB MCKINLEY

EMPLOYEES

520

POPULAR BRANDS

**PHAT PANDA
STICKY FROG
HOT SUGAR**

FLOWERING ROOMS

26

ANNUAL CANNABIS FLOWER PRODUCTION

**130,000 POUNDS
OF WET FLOWER**

SOURCE: GROW OP FARMS