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APPLICATION GUIDE

CANNABIS INDOOR GARDENING

OVERVIEW

Controlled Environment Agriculture (CEA) has been a rapidly expanding market over the last decade, especially when it comes to cannabis. By moving indoors, cultivators are able to accelerate the growing process. Outdoor farmers are limited to one harvest per year. However, when indoors, cultivators can manipulate light cycles, environmental set points, irrigation strategies, and other metrics to turn anywhere from four to six harvests in the same calendar year.

The growing process generally occurs between a temperature range of 65 F to 85 F although it depends highly on the cultivator, strain, plant age, light level, carbon dioxide level, and many other factors. As a broad statement, most growers begin with a higher temperature in the plant's infant stage. As the plant matures, the temperature is dropped week by week. There is also generally a 5 to 10 F temperature differential between simulated day and night. Lastly, cultivations which use an LED lighting strategy tend to lean towards warmer conditions than operations that use an HPS lighting strategy.

For the relative humidity (RH), most growers keep the plant environment in the range of 40% to 70%. Much like with temperature, the humidity is kept higher when the plant is younger and lowered as the plant matures. There can be up to a 10% difference between the day and night time humidity, but this varies greatly throughout the industry.

In working with cultivations of all sizes across the globe, we've witnessed a wide variety of growing styles and methodologies. These can even vary with the same grower depending on which cultivar they are working with. All these things must be factored in when sizing dehumidification equipment to ensure that the cultivator can achieve their desired environmental targets.

What are your operation's greatest cultivation challenges?



“HUMIDITY AND PEST MANAGEMENT REMAIN TOP CANNABIS ENVIRONMENT CONCERNS.”



CANNABIS BUSINESS TIMES
SPECIAL REPORT
HUMIDITY &
CLIMATE CONTROL

INFORMATION TO COLLECT:

This is a summary of the information to collect using the **New Quest Indoor Gardening Inquiry Form** to assist the Quest team in estimating the latent load in the grow room and outline a dehumidification plan.

FACILITY DESCRIPTION:

Provide any special situations, specifications, or issues that may exist with this facility, such as:

- Facility location
- Design goals
- Design constraints
- Cooling system specified
- Onsite power availability
- Planned HVAC/dehumidifier install locations

ROOM DESCRIPTION:

- Room quantities
- Room dimensions

CULTIVATION INFORMATION:

Because the growing process varies, we always ask for details that represent a "worst case" scenario:

- How many sq. ft. is the plant canopy
- How many tiers
- Number of plants in the room
- How much water is fed to the plants each day
- How much of the irrigation is drain to waste or runoff
- What are the target temperatures and humidities in the space

NEED HELP SIZING?

Our humidity experts are standing by to assist. Capture your project details on the new Quest Indoor Gardening Inquiry Form (see QR code below) and email to Sales@questclimate.com.



DOWNLOAD
INDOOR GARDENING
INQUIRY FORM

HELPFUL TIPS

When specifying dehumidifiers, it's good to always use at least two dehumidifiers, but preferably four to six. The reason for this three fold:



REDUNDANCY



MODULATION



EVEN DISTRIBUTION OF DEHUMIDIFIED AIR

EXAMPLE LOAD ESTIMATION:

The following example is for a typical flowering room in a grow facility:

ROOM DETAILS:

- **Room dimensions:** 50 ft x 30 ft x 14 ft
- **Plant Count:** 1,200 plants
- **Canopy Size:** 1,200 sq. ft.
- **Irrigation:** 1 L (2.1 pints) per day with 30% Runoff
- **Environmental Conditions:** 75-80 F and 55-60% RH

CALCULATIONS

- $(1,200 \text{ plants}) \times (2.1 \text{ pints/plant}) \times (.7) = 1,764 \text{ pints per day}$
- Plants will transpire 97% or more of the water that they uptake. Therefore, we assume that 100% of the water the plant drinks is transpired. Thus, we need 1,764 pints per day of dehumidification capacity.
- Since the temperature and humidity targets are not too far away from the rated condition, we do not need to derate the dehumidifiers.

EQUIPMENT RECOMMENDATION:

The table below shows the capacity of several units which could be utilized for this grow room.

UNIT	INPUT CONDITIONS		CAPACITY INFO AT INPUT CONDITIONS			
	TEMP (F)	RH (%)	CFM	PINTS PER DAY	LBS PER HOUR	PINTS PER KWH
QUEST 876	80	60	1,850	869	37.7	6.6
QUEST 506	80	60	1,500	493	21.4	8.2
QUEST 335	80	60	1,000	335	14.5	9.3
QUEST 225	80	60	526	225	9.8	6.2

Using the info in the table above, we have several options. The table below outlines the equipment sizing.

UNIT	LOAD	CAPACITY AT 80 F/60% RH	UNITS NEEDED	UNITS RECOMMENDED
QUEST 876	1,764 PINTS	869	2.0	2 – QUEST 876
QUEST 506		493	3.6	4 – QUEST 506
QUEST 335		335	5.3	6 – QUEST 335
QUEST 225		225	7.8	8 – QUEST 225

The two best options would be either the solution with the Quest 506 or Quest 335. Generally, it is good to avoid mixing and matching units as this can add unnecessary complexity. Of these two options, generally the facility design goals and constraints gathered will dictate which unit is the better fit.

If a customer has set points which drift too far from 80 F/60% RH, then it may be necessary to add more capacity to account for the performance loss at colder and drier conditions. If there is any question of how to do this, please don't hesitate to reach out to us for help with the calculation.



QUEST 335



QUEST 506

