

the NEWS

High Times for HVAC in Grow Facilities

Demand for climate control technology continues to increase



SPECIALLY DESIGNED: Anden offers dehumidifiers, humidifiers, and controls that are designed specifically for indoor farming operations.

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When it comes to indoor farming, cannabis usually dominates the conversation, as its legalization in numerous states over the last few years has led to a huge increase in the number of

facilities that grow these plants. However, indoor farming encompasses more than just cannabis and includes all kinds of agricultural products, including produce and livestock.

All of these types of facilities require extensive HVAC systems to ensure the products being grown and housed have the correct amount of heating, cooling, ventilation, and humidity. By using the right equipment to strictly control the indoor climate, growers can improve the health of their crops and boost their yields.

SPECIALIZED HVAC

According to a recent report by the research firm MarketsandMarkets, the indoor farming technology market is projected to reach \$40.25 billion by 2022, up from \$25.40 billion in 2017. While some of this growth can be attributed to the increasing demand for fresh foods that can be grown year-round, much of it will likely come from the cannabis market.

That's because the cannabis industry is booming right now, said Chip Seidel, channel manager at Anden. This is good news for the HVAC industry because these farms utilize a wide variety of equipment in order to keep strict control of the indoor environment. Anden offers dehumidifiers, humidifiers, and controls that are designed specifically for indoor farming operations.

“These facilities demand extremely tight control of relative humidity,” said Seidel. “The combination of continuous watering of plants and the sheer physical size in cubic feet of many of the operations requires dehumidifiers with commercial-grade componentry and capacities.”



COMMERCIAL COMPONENTS: The combination of continuous watering of plants and the sheer physical size of many grow facilities requires dehumidifiers with commercial-grade componentry and capacities, such as this one from Anden.

Adding humidity may also be necessary during the drying cycle of cannabis, so that the product does not dry out too quickly.



IT'S ELEMENTAL: The Element Air Tower, a PHI cell technology specifically built for grow facilities, can be free standing or wall mounted.

produce or livestock growth.

“Our products can help temper and condition the supply air and improve the indoor climate with reduced installed costs and operating costs,” he said. “End users are very concerned with how the HVAC system will enhance production or ensure product quality — they want to know that it will continuously provide an environment that will support their business operations.”

Maintaining precise control of the indoor environment and controlling airborne microbial contaminants are two of the main goals in grow facilities. That is why Element Air (launched more than five years ago by RGF Environmental Group) offers an adaptable line of 14 different IAQ products that are designed specifically to prevent microbials, like mold, and reduce odors in these types of applications.

“Mold and other microbials impact product quality and in the worst case, can wipe out a crop, resulting in significant financial loss to the owner,” said Tony Julian, vice president of business development, RGF Environmental. “These facilities are housing a

During this cycle, high-capacity steam units with precision control may be used in order to deliver and maintain the right rh levels to help ensure strong yields, he said.

Cambridge Engineering offers direct-fired heating and evaporative cooling ventilation systems for indoor farming applications.

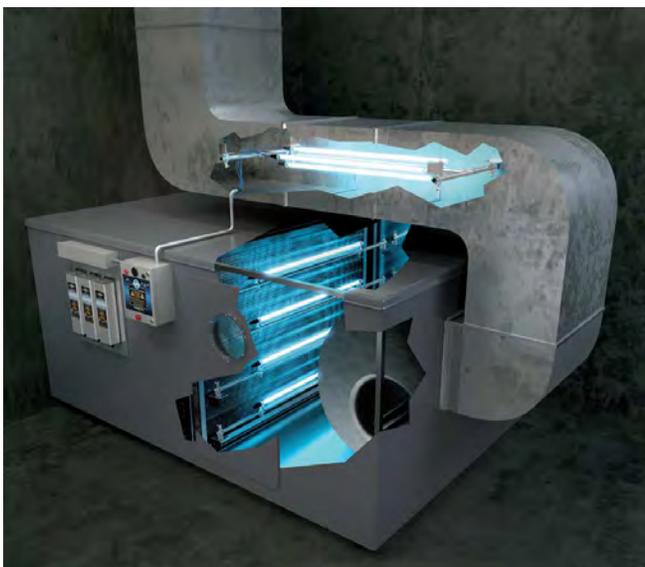
These products are a good fit for this market, said Dave Binz, the company’s director of engineering, because they can provide the large amount of fresh air ventilation that is needed to enhance



MITIGATING MICROBIALS: Element Air offers an adaptable line of 14 different IAQ products that are designed specifically to prevent microbials like mold and reduce odors in grow facilities.

very high dollar value commodity when compared with other commercial HVAC spaces, so the owners aren't messing around. They're ready to spend money but they also demand commitment and assurance that their investment is protected."

To protect their crops, many growers are investing in ultraviolet disinfection systems that can reduce contaminants such as *Botrytis cinerea*, a leading cause of powdery mildew that can affect the cannabis plant. Over the last five years, Fresh-Aire UV has seen increased demand for UV disinfection in grow facilities in order to reduce the mold and fungus that are often problematic for growers, said Aaron Engel, vice president of business development, Fresh-Aire UV.



UTILIZING UVC: Fresh-Aire UV systems are specially designed to deliver the necessary UVC dosage for deactivation of problematic microorganisms that can cause debilitating infections.

GrowAire™ System technologies, which provide growers with complete indoor climate control, said Paul Stewart, vice president of sales, Desert Aire LLC.

"These systems empower growers to optimize the growth rate and desired qualities of crops, meeting their needs for daily control of humidity and temperature as lights are cycled on and off, water and nutrients are delivered to plants, and as

"Fresh-Aire UV systems are specially designed to maximize UVC exposure with the air and surfaces designed to deliver the necessary UVC dosage for deactivation of problematic microorganisms that can cause debilitating infections," he said. "Our UV systems also maintain a clean and sterile air-handling unit and drain pan, which has shown to be the source of biological contamination while disinfecting the supply airstream and odors in exhaust-to-outside applications as the air passes through the UV lamp system."

Desert Aire has developed a dedicated product platform for climate control within indoor farms and grow spaces based on its

crops develop through their life cycles,” he said. “We also offer growers the opportunity to enhance their operation with the installation of Desert Aire’s AireGuard™ remote monitoring tool. This provides indoor farmers with the ability to easily monitor and enhance the performance of their GrowAire Systems on secure, cloud-based databases using any computer or portable device.”



OPTIMIZED GROWTH: Desert Aire’s GrowAire™ systems help growers optimize the growth rate and desired qualities of crops by ensuring proper air distribution. PHOTO COURTESY OF DESERT AIRE, GRIFFIN GREENHOUSE SUPPLIES, AND REVOLUTIONARY CLINICS

CHANGES AND CHALLENGES

The cannabis industry is not only growing fast, it is changing rapidly. With more regulations being put in place, especially concerning energy/water use and odor control, there may be consolidations in the industry, which will bring about a push for production environments at scale that could dwarf current operations, said Binz.

“Current market conditions are still good for smaller, independent ventures, but regulatory changes could actually bring about much larger competition that will put their enterprises at risk,” he said. “That’s why indoor farmers are taking energy costs much more seriously. As these operations can take on massive cooling and heating costs to achieve optimal yields or high medicinal levels of quality, the operating expense of their HVAC system will greatly affect their ability to compete in an increasingly competitive landscape.”

Cannabis growers are already seeing great pressure to reduce their production costs as supplies increase and prices for products fall, said Stewart.

“In several mature markets, prices have dropped dramatically due to oversupply, and this has put significant stress on growers to be more efficient,” he said. “Fast forward five years, and the growers that survive will be the ones that are the most efficient or the ones that have created a market niche.”

Others may be absorbed into big corporate grow facilities, which is where the needle is already moving, said Julian.

“Grow facilities of all shapes and sizes are popping up as more states pass medical and recreational cannabis laws,” he said. “The current scale of cultivation and the size of these facilities is like nothing the agricultural industry has seen before. Many grow facilities are now run by big corporations that are really well funded, but they expect results and will hold their suppliers accountable. RGF entered the cannabis market more than five years ago, and it will continue to be a huge area of growth for the company.”

It is also a big opportunity for HVAC contractors, who will be called upon in ever-increasing numbers to address the many aspects of climate and environmental control for grow and agriculture facilities, according to Engel.

“HVAC contractors are experts in their field, and they will need to be able to offer solutions such as ultraviolet disinfection for the various IAQ issues that growers may face,” he said. “These may include humidity, climate, temperature, and IAQ issues. As this emerging market continues to evolve, contractors are learning and applying their newfound experience to help solve these unique challenges for indoor grow and agriculture facilities.”

One of the biggest challenges for contractors will be to make sure they understand the unique environment of these types of facilities, particularly the latent and sensible loads of the spaces, noted Stewart.



EVAPORATIVE EFFECT: When determining environmental loads, many growers forget about the evaporative cooling effect of the plants as they transpire water vapor. PHOTO COURTESY OF DESERT AIRE, GRIFFIN GREENHOUSE SUPPLIES, AND REVOLUTIONARY CLINICS

“That sounds easy, but it starts with a thorough evaluation of the environmental loads,” he said. “What are the sensible cooling loads in the space? How much moisture will need to be removed from the space? Is there heat loss in the room in winter months? And don’t forget about the evaporative cooling effect of the plants as they transpire that water vapor. This is a common mistake made by many when designing a grow room. People forget how a plant processes the water it consumes and how this moisture is absorbed back into the air.”

This type of specialized knowledge may require additional training, as contractors will increasingly be asked to design HVAC systems that maintain a precise indoor environment in order to maximize crop yield and reduce energy usage, said Seidel.

“Most HVAC pros did not go to school to learn to grow plants — they learned about HVAC systems,” he added. “While they don’t necessarily need to become expert cultivators, they do need to learn enough about the unique indoor conditions required for a successful grow operation. Contractors need to listen to each cultivator’s needs, because they are the horticulture experts, and they know the indoor environmental needs of the plants they grow. My advice is to speak to an application professional — we can help.”

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