

The demand for CBD products is booming. Even the COVID-19-induced economic contraction has not been enough to slow the explosive growth of the hemp industry, which hopes to ride the coattails of cannabidiol to the Promised Land.

The cannabis research firms, BDS Analytics and Arcview Market Research, estimate that by 2024, U.S. consumers will spend more than [\\$20 billion annually](#) on products made with hemp-derived CBD oils. To put that in perspective, domestic sales of CBD products in the United States only surpassed the \$1 billion mark for the first time in 2019.

The market for CBD extracts will be driving much of this growth, as industry prospectors are well aware. But tapping into the CBD gold vein requires hemp extraction technology that can function at commercial scales.

And so, equipment manufacturers in the cannabis space are hard at work, designing and building commercial-scale hemp extraction equipment that can process hundreds or even thousands of pounds of hemp biomass daily.

Here's what a few industry leaders have accomplished so far:

The Vulcan from Precision Extraction Solutions

Somewhat resembling a miniaturized Borg cube, but carrying a name from another Star Trek culture, [the Vulcan](#) is the latest groundbreaking entry in Precision Extraction Solutions' acclaimed KPD Series of industrial-scale extractors.

No other company has spent as much time and energy developing powerful machines to service the cannabis/hemp industry as Troy, Michigan's [Precision Extraction Solutions](#). The introduction of the Vulcan represents the culmination of their tireless efforts.

Developed in coordination with AMG Engineering, the Vulcan is an industrial-scale, modular extraction platform that can process a remarkable 10,000 pounds or more of hemp or cannabis biomass in a single day. This feat puts the Vulcan in a separate category from most other retail hemp oil extraction systems, which aren't built to handle such heavy loads.

A team of Precision technicians will deliver and install Vulcan platforms on-site at their customers' chosen locations. This Vulcan system is functional and fully automated from day one and requires only four people to run it despite its massive bulk and capacity. Its ethanol solvent will be continually recycled at 99 percent reclamation rates, adding yet another level of efficiency to an amazingly efficient system.

Cool Clean Technologies' Cold CO2 Extraction Equipment Line

Traditional [supercritical CO2 technology](#) relies on high temperatures to complete the extraction process, with the liquefied carbon dioxide acting as a solvent. Yields with this methodology are

good, but the heated CO2 can damage terpenes and other vital phytochemicals and diminish the CBD oil's full-spectrum profile.

Cool Clean Technologies from Eagan, Minnesota, has found a way around this problem. They've introduced [a patented Cold CO2 Extraction System](#) that matches the efficiency of supercritical processes without compromising on hemp oil quality.

Their extraction equipment uses cold carbon dioxide to smoothly and swiftly separate desirable cannabinoids and terpenes from plant material, without breaking the bonds that link them together and trigger the much-sought-after [entourage effect](#). The Cold CO2 system can be fine-tuned for precision extraction to produce richly dense CBD oil that contains an ideal mixture of full-spectrum ingredients.

Cool Clean's most proficient machine, the BX-610, can process up to 700 lbs. of dry hemp material in a single day, making it an economical choice for small- or moderately-sized extraction companies. Cold CO2 Extraction Systems are fully automated and will reclaim up to 99 percent of their carbon dioxide solvent for continual reuse.

Integrated Extraction Solutions from Apeks Supercritical

Ohio-based Apeks Supercritical sells two small-scale commercial extraction machines, known as the Duplex and the Force, respectively. The former can process up to 180 lbs. of dried biomass each day, while the latter can handle up to 200 lbs. of harvested hemp over the same period.

One unique feature of the Duplex and Force extraction machines is that either can be programmed for supercritical (high temperature) or subcritical (low temperature) CO2 solvent extraction. Supercritical extraction maximizes gross output but may leave some valuable terpenes behind. In contrast, subcritical extraction removes less CBD oil from plant material but leaves the terpene profile intact.

For smaller commercial operators looking to scale up as best they can, Apeks' ingenious Fleet platform is recommended. The Fleet is an industrial-strength chiller that can be installed outside a cannabis processing facility, after which it can be linked to Apeks' CO2 extraction equipment installed inside the building.

The Fleet can be integrated with up to three Apeks extraction machines at a time, creating a unified system that will triple output with no further intervention required. Through the Fleet, all heat generated by the integrated extraction machines can be vented outside, eliminating the need for budget-breaking air conditioning systems that smaller operators might struggle to afford.

Radiant Technologies' MAP Extraction System

[Radiant Technologies](#), which is headquartered in Vancouver, B.C., has introduced a new technology for hemp oil extraction that could revolutionize the industry's commercial sector, which they call the MAP Extraction System. [MAP stands for 'microwave assisted processing,'](#)

and as the name suggests, MAP technology does indeed heat hemp and cannabis biomass with microwaves, to facilitate more efficient solvent-based extraction downstream.

The use of microwaves on hemp and cannabis has proven to be a highly effective innovation. Through this methodology, heating input can be precisely controlled to produce extracts with specific chemical formulas. Up to 99 percent of desirable cannabinoids and terpenes are preserved by the MAP Extraction System, which is significantly higher than the 70–80 percent success rate achieved by most standard extraction technologies. MAP technology can finish processing hemp or cannabis oil more quickly than other systems, mainly because it eliminates the need for post-extraction winterization.

Radiant does not produce modular systems for on-site installation. Instead, they've constructed [massive extraction factories near Edmonton, Alberta](#), from where they provide extraction services to their corporate partners for a fee.

Radiant's original facility in Edmonton is used exclusively to process cannabis. But their second facility, which was completed in 2019 and licensed earlier this year, will be dedicated entirely to hemp processing and CBD extraction. Radiant officials say the plant will be capable of processing up to 420,000 kilograms of hemp biomass in a single year, which represents about 2,500 lbs, daily.

The Mile High Monster from Mile High Labs

Seeking to reduce transportation costs for themselves and their clients, while scaling up to industrial-sized extraction capabilities, [Mile High Labs out of Broomfield, Colorado](#), has created one of the most powerful hemp oil extraction systems found anywhere on the planet. This behemoth is called, appropriately enough, the Mile High Monster.

The Monster is a high-output, continuously-fed ethanol extraction plant that can process up to 50 acres of hemp biomass each day. In essence, it occupies the midpoint between mobile retail extraction platforms like those sold by Precision and gigantic, centralized facilities like those built by Radiant. The Monster can extract on a massive scale, but it was designed to be installed on-site, on large-scale hemp farms in heavily trafficked growing areas.

Growers who contract with Mile High agree to have the Monster installed on their property. But Mile High retains ownership of the extraction system, paying the grower for the right to process their hemp. Other farmers who grow hemp in the area can also be recruited as customers, with Mile High Labs acting as a wholesaler for the massive quantities of CBD extract they are ultimately able to produce.

Two Mile High Monster systems have already been installed on hemp farms in eastern and southern Colorado. Mile High Labs expects to increase its hemp oil extraction capacity by 1,000 percent as a result, and commercial-scale factories have been programmed to produce the type of full-spectrum CBD oil that consumers crave.

Draconis Extraction Technologies' Patented Extraction/Distillation System

Looking to capture a significant share of the burgeoning hemp market in their home state and beyond, Draconis Extraction Technologies from Bowling Green, Kentucky, has patented an innovative new ethanol-based hemp extraction system suitable for mass-scale biomass processing.

Interested parties are advised to consult with the Draconis engineering team, which can design customized extraction systems that can process anywhere from five to 100 tons of hemp every day, with ethanol reclamation rates of over 95 percent.

[High-efficiency Draconis extraction equipment](#) is fully compatible with renewable energy systems and features automated control that ensures fast, efficient, and continuous operation. Unlike many systems, it can process both wet and dry biomass.

Draconis offers both installation and facility management services but will train clients to operate the extraction plant themselves if that is their preference. Company representatives are currently in negotiations with several farmer coops, which possess the resources to afford the technology and could benefit from its commercial-scale extraction capacity.

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