



system

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**Infinity Turbine
LLC**

**New 10L Infinity Supercritical CO2
Extraction System**



This webpage QR code

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Supercritical CO2 Extractor 10L system for botanical oil extraction. Can be run at a subcritical pressure and up to 2,000 psi. Runs completely silent since the process does not require a air compressor. Supercritical CO2 may also be used for vapor deposition for sulfur on carbon nanofiber for battery research.

PDF Version of the webpage (first pages)

<https://www.infinityturbine.com/supercritical-co2-extraction/system.html>

Supercritical CO2 10L Extractor System

Supercritical CO2 Extractor 10L system for botanical oil extraction.

This system is built like a tank. Powder coated caster beams with 5 inch heavy duty casters for easy movement.

This system is compact and will fit through any standard door, hallway, or elevator.

System operation is manually set parameters, with automatic feedback PID to maintain temperature and pressure. Set it and watch the extraction.

System is designed for maximum 2,000 psi operation. Most processors use 1,400 psi or less.

Terpene extraction can be done running cold prior to turning on the heat for FSO extraction. This system is great for lavender, vanilla, pinene, and other valuable terp extractions.

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Supercritical CO2 System Support Files Package

\$99 support package includes:

A. Cat 310 Conversion Kit to CO2 Duty (for a fraction of the cost of purchasing a dedicated CO2 pump from Cat). Parts list only. Support is not included. Pressure seal manufacturer for high and low pressure seals as low as \$4.00 a seal versus \$30-50 a seal from Cat Pumps. Pump assembly checklist.

B. 10L Botanical Basket Cad/Cam files including supplier in China for full build purchase.

C. Infinity Supercritical 10L Consumable Parts List and Suppliers with links. Includes PID controller, Cat pump parts, hoses, motor pump coupler, down tube material, CC1 CC2 CC3 O-Rings part number and supplier, brass sleeve o-rings, extraction vessel o-rings, pump valve o-rings, exhaust hose, low and high pressure pump seals, 3 micron stainless steel filter for CC3 (to prevent any material from going into pump), Cat 310 pump valve replacement kit, pump brass sleeve replacement kit, and pump stainless steel retainer.

D. Supercritical CO2 Automation Information including flowcharts, components, PID justification, and more.

E. Customer Training Checklist.

F. 10L Installation Checklist.

G. 10L Flow Diagram.

H. Crate build cad/cam and parts list.

The above information includes parts lists, part numbers, and suppliers when available. Support is optional and additional.

Package is available via download (zip file 98.4 mb) after payment is confirmed by Infinity.

Terpenes Extractor

Other ways to make profit are to run as a terpene extractor. This can be done by running the system cold (no heat). If you want to make alpha Pinene (a terpene which is common in Pine Needles, Pine Oleo Resin, Basil, Orange Peels, Rosemary, Cumin, and others).

Here is a short abstract of a-Pinene: These two phytochemicals exhibit diverse biological activities, leading them to various applications and uses, such as fungicidal agents, flavors, fragrances, and antiviral and antimicrobial agents. In addition, alpha and beta pinene are components of renal and hepatic drugs. Also, alpha and b-pinene are used as antibacterials due to their toxic effects on membranes.

Moreover, alpha and beta pinene have been found to have inhibitory effects on breast cancer and leukemia. The application of pinenes goes beyond natural medicine; for instance, they have been proven to be very flexible in the synthesis of polymers; polymers synthesized from pinenes are of better quality than other polymers.

The safety profile of pinenes is considered outstanding, allowing their use in various chemicals, and they are generally recognized as safe (GRAS). Thus, due to their physicochemical characteristics, it is challenging in the process of biotransformation, but are still used in the production of aroma compounds.

(full science reference at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6920849/>)

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The finest craft supercritical CO2 full spectrum oil extraction. Botanical oil extraction.

Supercritical CO2 Extraction – Completely Silent – No Air Compressor Required – Start Your Botanical Oil Extraction Profits Today – Fast 1-4 Hour Extraction. Great for extraction and full spectrum oil right out of the machine. Produces the best quality extract in the industry. Leave waxes behind if you run near subcritical (reduces or eliminates winterization). Output oil straight out of the machine near isolate quality (85 percent).

Lithium Sulfur Battery Research using Vapor Deposition of Sulfur on Carbon Nanofiber

Lithium Sulfur Battery Research using Vapor Deposition of Sulfur on Carbon Nanofiber: One interesting application may be for the research and production of lithium sulfur batteries. Using CO₂ may be one possible route to commercialization of production. (The team found that during the process of depositing sulfur on the carbon nanofiber surface, changing it from a gas to a solid, it crystallized in an unexpected way, forming a slight variation of the element, called monoclinic gamma-phase sulfur - [link below](#).)

The modular construction of the system allow easy integration for new technology developments, and multi-role additions. The heart of the system is the phase change liquid pumping techniques, flow bar, and tribo effect electrostatic precipitation collection system. Many of these deployed technologies were developed by Infinity since 2015 making this system the most advanced in the industry. More than 100 of these commercial systems have been built and out around the world.

Processing Advantages

Low Carry-Over (More Extracted Oil You Can Sell): Reducing carry-over saves time and parts costs in system maintenance, and puts more profit into your pocket. It also means less time spent on upkeep with the machine, and more time spent on extracting oil.

Target Oil and Reduce Post Processing Time (Save more than 50 percent of your time by targeting oil you want, not wax): Systems are designed to target oil production at pressures lower than 2,000 psi, which specifically can retain valuable terpenes, and emphasize oil harvesting, instead of waxes and other byproducts, which need to be removed in post processing. The crude oil output from the 10L is considered a full spectrum oil, and can be sold directly as-is, or mixed with a carrier oil (such as coconut oil) and bottled for sale.

Run 2 Months Without Pump Cleaning (expert status operator with training and experience): Quiet, reliable, and lowest maintenance CO2 pump in the industry. We have one customer who has run his machine almost everyday for 2 months without cleaning his CO2 pump. We also are the first company to provide a bolt-on pump cleaner to clean your pump head in-place. We specialize in collecting the oil before it gets to the CO2 pump using our proprietary electrostatic collector. Others make you buy additional pumps, or require cleaning every few days.

Cleaning: Respect your equipment, and it will operate great. We recently had one customer comment that the 10L was a gold mine and was looking forward to his second machine, to make even more profit. Keeping a system clean so that it operates correctly is true with most equipment.

We recommend always keeping your machine clean, and at least every 15 cycles do a thorough ethanol clean out of the system. If you do not clean your machine, expect that it will not work at all.

We've had customers that don't clean their machine at all, and they go through seals on a weekly basis, then wonder why it isn't operating up to expectations. We've had a few groups return machines for repair, and all that was needed was a good machine cleaning. Have some respect for your profit center, and you'll get great results.

System Components: 3 collection vessels with bottom exit valves, heat recovery system, CO2 preheat, electrostatic collection, FlowBar, spares package, shipping, crate, chiller, extra baskets, bolt on pump cleaner, training, support, pump head cleaning holder, vent tube and manifold, CO2 monitor, CO2 liquid sight-glass.

CO2 Extraction System Full Configuration

Capacity: 10 Liter (1-3 pounds of dried flower)

Operation: Semi-Automatic Pressure: 2,000 psi

Power: **220V 60hz Single Phase**
(for European installations you must have 60hz)

Engineer Peer Reviewed:
California, Colorado, Nevada, Washington, Arizona, Oregon

How it Works

High pressure liquid CO₂ is pumped into an extraction vessel, which brings the CO₂ supercritical as it goes into the separation/collection vessels.

As the botanicals come in contact with the CO₂, the oil is released into the CO₂, since the CO₂ acts as a solvent. The gas and oil (co-mingled) are released into the separation/collection vessel where the pressure drops and the botanical oil drops out as a liquid.

The CO₂ gas is then condensed back to a liquid via a small heat exchanger, and then recirculated through a CO₂ pump to start the cycle over.

The system is closed-loop.

System Operation

Electrostatic Precipitator: Infinity Supercritical is the first in the industry to utilize static electricity to assist in collection of oil. Commonly known as ESP, electrostatic precipitation is a method used in many industries to remove particulates in a gas flow. In this case, we're applying some same technology (but with our own invention) to collect oil. A small charge accumulates in the entrained oil, which makes it adhere to the first collection vessel.

Semi-Automated: Turn the CO2 pump on, and leave it on. You can adjust the pump speed, which sets the pressure. The system runs in a steady-state once started. This is a 2,000 psi or less working pressure system. Typical runs will be at 1,300 to 1,800 psi. The system working pressure is rated for 2,000 psi. A safety relief valve is provided to release any pressure which goes above 2,000 psi. Targets oil at or below 2,000 psi to minimize post processing. High Pressure Systems (above 2000 psi) = lots of post processing.

Fittings: We use quality Swagelok fittings. System is made in the USA.

FlowBar: The CO2 FlowBar enhances the CO2 delivery and distribution within the botanicals extraction vessel. While almost every CO2 extraction system enters in one end and exits the other, our new concept delivers CO2 in a uniform manner throughout the entire extraction vessel. The result is a much faster, and more thorough extraction.

Producing Alcohol from Liquid CO2

Infinity has already built lots of closed-loop supercritical CO2 systems, and experimented with CO2 cavitation to make a one-moving-part liquid CO2 pump.

Infinity currently sells a cart-mounted portable on-demand supercritical CO2 phase change system for \$150,000 which can be used for the experiments listed below, along with many others. It is a cart which was designed to fit through any standard door, hallway, or elevator and has heavy duty casters for mobility.

We are currently looking for funding to develop the following:

1. On-Demand CO2 to Alcohol: Using our closed-loop liquid CO2 phase change system, adding Nafion in the process to make alcohol. Inputs: Liquid CO2, water, and electricity. About 3-4 kW to make a liter of alcohol (from lab experiments).
2. CO2 to Alcohol with In-Situ Power Generation: Using our closed-loop supercritical CO2 phase change system, produce the power via miniature CO2 turbine generator or static electricity generator (SEG) to power the conversion via Nafion.
3. Spin-To-Liquid (STL): A novel one-step approach to producing alcohol from liquid CO2 using a cavitation device with Nafion. This is a one-moving-part device employing sonochemistry with inputs of water and liquid CO2. Electricity is produced in-situ. Shaft rotation is required to spin the device (this can be done via an electric motor, pressure expanding turbine, or other shaft rotation such as a wind turbine).

You can further our efforts by buying our \$150,000 systems (which we build - and have four in stock) or by considering an investment to fund our development.

Teaser: Why was Nikola Tesla so fascinated with static electricity and spinning discs? Our guess is that he had already found the world's best battery - water. The Tesla turbine (while a fascinating pump) was actually a static electricity generator originally designed to charge water. All of his Colorado Springs experiments revolved around static electricity. Power generation and (wireless) transportation was via static electricity.
