CannabisSFE - Supercritical CO_2 Extraction Unit
Optimized for Processing of Medicinal Cannabis and Natural Herbal Products

- One Liter, Expandable CO_2 Extraction System
- Base Package Vessel Capacity of 1 Liter
- Wide Pressure & Temperature Range (10,000 psi / 120°C)
- Efficient Pneumatic Liquid CO_2 Pump / Waterless Pre-Chiller
- Upgrade to Cascade Mode – Can Yield up to 120grams/hour (Raw Material Dependent)
- Optional: CO_2 Recycle, Raw Material Bags, Loading Fixture
- ASME Code Compliant Vessels and Components

◀ **CannabisSFE - One Liter Processing Unit**

The **CannabisSFE** has been designed to obtain high quality extracts from all parts of the cannabis plant. The system utilizes the environmentally friendly technique known as supercritical CO_2 extraction. By incorporating a flexible processing platform, it may be configured to use one, two or three 1000ml processing vessels. This modular approach affords a simple and inexpensive entry into supercritical CO_2 extraction of cannabis with the opportunity to increase production capacity with a second and third vessel when greater capacity is required. With three 1000ml vessels, the unit can operate in a full cascade mode and can yield up to 120grams/hour (Raw Material Dependent). Depending on Raw Material Mix, the **CannabisSFE** Basic Package Yields up to 45grams of product/hour and the 2 Vessel Unit up to 60 grams/hour.

The demand for pharmaceutical grade cannabis oil has increased and this trend will continue as the therapeutic value of these extracts is recognized. Research has demonstrated the value of cannabis extracts to treat a variety of ailments such as muscle spasms, glaucoma, nausea, mood and behavioral disorders, sleep disorders, and chronic pain.

A key advantages of CO_2 extraction is the ability to fine-tune the solvating power to target specific compounds. This is done by varying the pressure of the CO_2, temperature, solvent-to-feed ratio, and flow rate. There

is more to medical marijuana than just the two principal cannabinoids (THC and CBD) that are found in the plant. In fact, multiple biologically active compounds have been identified. However, exactly how many of these compounds and in what combinations contributes to its overall medicinal efficacy (the entourage effect) is not well understood.

While a whole plant synthesis is not technically or economically feasible, a whole plant extraction (both non-polar oil and slightly polar terpenes) can be obtained by varying both the pressure and temperature from the extremes from sub-critical conditions to supercritical (Over 1071psi / 31.1C°) conditions. Unlike other commercially available systems, this whole plant extraction is exactly what the **CannabisSFE** has been designed to do. There is no need to perform a distillation step since, upon dropping pressure, the $scCO_2$ becomes a gas. The extracted material is pure and in its natural state. The CO_2 may be safely vented or optionally recycled for even greater efficiency. Since the solvency power of the fluid is pressure dependent, it is possible to fractionate to obtain multiple compositions from a single raw material. This makes some separations possible that are difficult or impossible to do with traditional liquid solvent and distillation processing.

Standard System Specifications

Maximum Operating Pressure: 10,000 psi (68.9 MPa).

Pressure Display: Pressure gauge for each processing vessel

Temperature Range: Ambient to 120˚C.

Temperature Precision: +/- 0.5˚C.

Temperature Display: PID Control/ LED. Displays internal vessel temperature.

CO_2 Flow Rates: up to 200mls/min (~176 g/min) liquid CO_2

Restrictor Valve: Heated up to 120˚C; Resistant to blockage up to 200mls/min. (~176grams/min.)

Integrated Waterless Chiller Assembly: The integrated Peltier waterless chiller uses thermoelectric cooling of the liquid CO_2 from the delivery tank. The chilled CO_2 is then delivered directly to the pneumatic supercritical fluid pump. Proper cooling of the CO_2 before it arrives at the pump ensures that the CO_2 is pumped in an efficient manner that eliminates pump cavitation to achieve the pressures and flow rates required for supercritical fluid extraction processes.

Sample Extraction Vessel: CannabisSFE accommodates up to three, 1000ml processing vessels

Collection Vessel: Externally mounted cone shaped cyclonic separator for ease in extract removal

Pre-heater: Improves temperature consistency of the fluid by heating the fluid before it reaches the main sample extraction vessel(s).

Over-Pressure Safeguards: Rupture disc assembly.

Instrument Control: Vessel and preheater temperature controlled by PID-Fuzzy Logic Controllers. Pressure controlled by manual regulator.

Dimensions: CannabisSFE basic package 1x 1000ml: Width: 27.00", Depth: 14.36", Height: 30.13"

Weight: CannabisSFE basic package: 140 lbs.

Available Options

Additional 1000ml Processing Vessel Assemblies Allowing up to Full Cascade Operation: Easily field installed upgrades to processing capacity that allow added processing capabilities as needs evolve.

Sample Loading Fixture: Allows ease in loading raw materials into polyester 150 micron/100 mesh sample bags (or other sample bag materials) and into the 1000ml vessel of the **Cannabis**SFE Unit.

Raw Material Sample Bags: 1000ml polyester 150 micron/100 mesh sample bags. Allows ease in loading raw materials into and removing from the processing vessels.
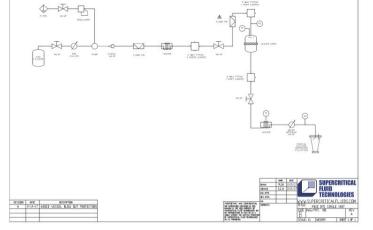
Robot Couple Blixer3™: Grinding plant material will increase the surface area and load of material into the extractor which increases extraction efficiency. This grinder performs particle reduction fast and efficiently and will grind 300-400 grams of dried trim/flower down to approximately 200 microns in 3-4 seconds.

System Requirements

Power Requirements: 220 VAC, 50/60 Hz.

Liquid Gas Supply: Liquid CO_2 cylinder with dip tube.

House Air: Dry air, regulated to 110 psi (760KPa) and 15 SCFM.

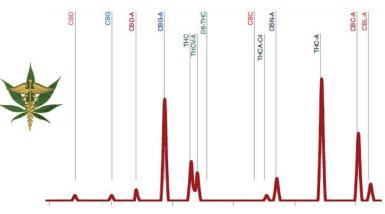**Cannabis**SFE P&ID 1x 1000ml Processing System

Figure 1: *Smart* **CannaLC** Analysis of Extracted Cannabis Oils Using the **Cannabis**SFE Processing System

P/N: CannabisSFE-SPEC