



SFT-Natural Products Extractor - Supercritical CO₂ Extraction Optimized for Processing of Botanicals, Herbs, Spices, Essential Oils, and Natural Products



- One Liter, Expandable CO₂ Extraction System
- Base Package Vessel Capacity of 1 Liter
- Wide Pressure & Temperature Range (10,000 psi / 120°C)
- Efficient Pneumatic Liquid CO₂ Pump / Waterless Pre-Chiller
- Upgrade to Cascade Mode – Can Yield up to 120grams/hour (Raw Material Dependent)
- Optional: CO₂ Recycle, Raw Material Bags, Loading Fixture
- ASME Code Compliant Vessels and Components

◀ SFT-Natural Products Extractor

The **SFT-Natural Products Extractor** has been designed to obtain high quality extracts from botanicals, herbs, spices, essential oils, and other natural product materials. The system utilizes the environmentally friendly technique known as supercritical CO₂ extraction. By incorporating a flexible processing platform, it can be configured to use one, two or three 1000ml processing vessels.

Using Supercritical CO₂ to perform extractions on natural and organic materials has significant benefits over the use of traditional liquid solvents. CO₂ enters the supercritical region at an elevated temperature and pressure, where it is no longer a liquid or gas. It becomes a supercritical fluid. Under these conditions, the fluid possesses many characteristics of a liquid solvent with the added benefit of high diffusivity. By varying pressure within the supercritical region, the solvating power of the fluid is changed. This enables selective extraction of desired components. There is no need to perform a distillation step since in returning to atmospheric pressure the CO₂ becomes a gas. This means no residual solvents are in either the extract or remaining biomass. Additionally, given that the solvency power of the fluid is pressure dependent, it is possible to fractionate to obtain multiple components from a single raw material. This makes it practical for some separations that are difficult or impossible to do with traditional liquid solvent and distillation processing.

Our modular approach affords a simple and inexpensive entry into supercritical CO₂ extraction of natural and/or organic materials 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). The SFT-Natural Products Extractor Basic Package Yields up to 45grams of product/hour and the 2 Vessel Unit up to 60 grams/hour.

The demand for high purity extracts from botanicals, herbs, spices, essential oils, and other natural product materials has increased. This trend will continue as the therapeutic and health benefits of these extracts is recognized. Research has demonstrated the value of natural product extracts to treat a variety of ailments such as muscle spasms, glaucoma, nausea, mood and behavioral disorders, sleep disorders, and chronic pain.

Botanicals, herbs, spices, essential oils, and other natural product materials extraction (both non-polar oil and slightly polar analytes) can be obtained by varying both the pressure and temperature to supercritical conditions (Over 1071psi / 31.1°C). There is no need to perform a distillation step because, upon dropping pressure, the scCO₂ becomes a gas. The extracted material is pure and in its natural state. The CO₂ may be safely vented or optionally recycled for even greater efficiency. As the solvency power of the fluid is pressure dependent, it is possible to fractionate to obtain multiple compositions from a single raw material.

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: +/- 1°C.

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

CO₂ Flow Rates: up to 200mls/min (~176 g/min) liquid CO₂

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 CO₂ from the delivery tank. The chilled CO₂ is then delivered directly to the pneumatic supercritical fluid pump. Proper cooling of the CO₂ before it arrives at the pump ensures that the CO₂ 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: SFT-Natural Products Extractor 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: SFT-Natural Products Extractor basic package 1x 1000ml:
Width: 27.00", Depth: 14.36", Height: 30.13"

Weight: SFT-Natural Products Extractor 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 **SFT-Natural Products Extractor 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.

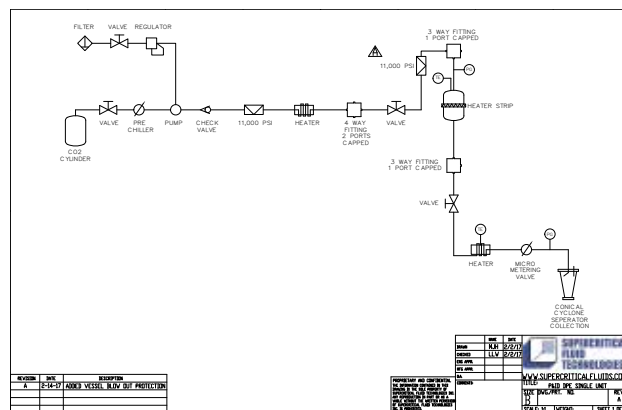
Robot Couple Blixer3™: Grinding plant material will increase the surface area and load of material into the extractor which increases extraction efficiency. This grinder performs particle reduction fast and efficiently and will grind 300-400 grams of dried botanicals, herbs, spices and other natural product materials down to approximately 200 microns in 3-4 seconds.

System Requirements

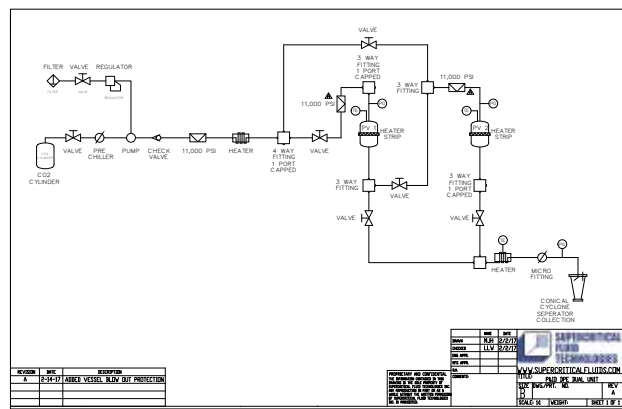
Power Requirements: 220 VAC, 50/60 Hz.

Liquid Gas Supply: Liquid CO₂ cylinder with dip tube.

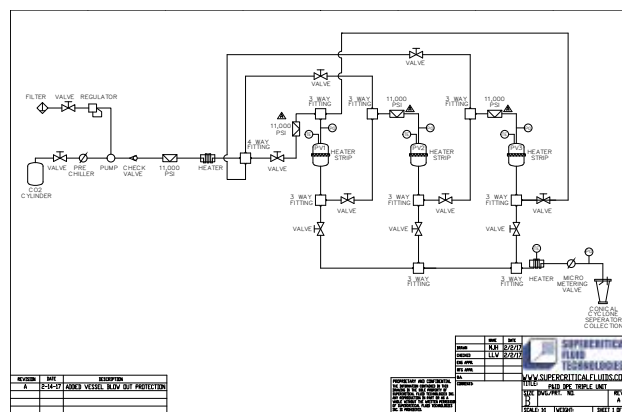
House Air: Dry air, regulated to 110 psi (760KPa) and 15 SCFM.



SFT-Natural Products Extractor P&ID 1x 1000ml Processing System



SFT-Natural Products Extractor P&ID 2x 1000ml Processing System



SFT-Natural Products Extractor P&ID 3x 1000ml Processing System