



## SFT-SP3500 Supercritical Fluid Processor

### Rapid CO<sub>2</sub> Extraction of Natural Materials



▲ SFT-SP3500

The Supercritical Fluid Processor **SFT-SP3500** has been designed to obtain high quality extracts from botanicals, herbs, spices, essential oils, and other natural product materials. The design offers three five (5) liter vessels for cascade mode of operation which allows the system to process biomass quickly with minimal maintenance and downtime. Built as a mid-range system, the **SFT-SP3500** provides flexibility for both subcritical and supercritical CO<sub>2</sub> extractions.

Within the compact footprint of the **SFT-SP3500** are three 5-liter processing vessels, and a powerful liquid CO<sub>2</sub> pumping system. This system delivers liquid CO<sub>2</sub> at flow rates up to 1,500 mls/min (1,250 grams/min) maximizing throughput efficiency and providing a very rapid extraction. Configured to operate in cascade mode, this supercritical fluid processor processes through two vessels concurrently, while the third vessel can be taken off-line for the loading and unloading of raw material. The net result is 12.5 pounds (5675 grams) of biomass extracted per hour.

Using Supercritical CO<sub>2</sub> to perform extractions on natural and organic materials has significant benefits over the use of traditional liquid solvents. CO<sub>2</sub> 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 the high diffusivity of a gas. By varying pressure within the supercritical region, the solvating power of the fluid is changed. This enables selective extraction of desired components. 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.

- Efficient liquid CO<sub>2</sub> pumping with electric liquid CO<sub>2</sub> pump and pre-chiller
- Flow rates up to 1500mls/min (1250 g/min) liquid CO<sub>2</sub>
- Up to 8000psi (552 Bar, 55.2 MPa) operation
- Ambient up to 120°C operation (perform supercritical and subcritical extractions)
- Easy access of collection assembly for removal of extracts
- Compact Design (78" L x 43" W x 42" L)
- Includes full liquid CO<sub>2</sub> recycle (7-Liter accumulator)
- Optional raw material loading fixtures, pre-processing grinders, 150 micron sample bags, or SS baskets
- Optional Co-Solvent Addition Module to Extract Polar Components
- ASME Code Designed vessels & components.
- Meets current GMP Standards

Our approach offers simple and inexpensive supercritical CO<sub>2</sub> extraction processing of natural and organic materials by increasing production capacity with three vessels operating in cascade mode. The system can be run 24/7 with consistent results and minimal downtime. Our extraction equipment was developed with over 27 years of experience in building supercritical fluid CO<sub>2</sub> extractors to serve the pharmaceutical industry, government agencies, and university researchers. We understand the need for quality, safety, and performance.

Botanicals, herbs, spices, essential oils, and other natural product materials (both non-polar oil and slightly polar analytes) can be extracted by varying both the pressure and temperature within the supercritical region (Over 1071psi / 31.1°C). As the solvency power of the fluid is pressure dependent, it is possible to fractionate to obtain multiple compositions from a single raw material. The CO<sub>2</sub> is recycled for even greater efficiency.

#### Natural Products Extractor to Obtain:

- Biologically active compounds from plants, including cannabis and hemp\*
- Flavors from fruits, vegetables, spices & herbs
- Fragrances from flowers and other plant materials
- Essential oils from a wide variety of plant materials

\*Cannabis and Hemp Specific Packages Available.

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# Expanded System Specifications

**Maximum Operating Pressure:** 8,000 psi (55.2 MPa)

**Pressure Display:** Pressure gauge for each processing vessel Temperature

**Range:** Ambient to 120°C

**Temperature Precision:** +/- 0.5°C

**Temperature Display:** Allen Bradley PLC with panel view touchscreen. Displays internal vessel temperature

**Liquid CO<sub>2</sub> Flow Rates:** Up to 1500mls/min (1250grams/min) liquid CO<sub>2</sub> at 8,000psi electric driven pump

**Restrictor Valve:** Extractor pressure controlled by Equibar Back Pressure Regulator, heated up to 120°C; resistant to blockage (factory set to 80°C). Requires user to provide 4000 - 6000 psi nitrogen cylinder.

**Integrated Chiller Assembly:** The integrated chiller cools the liquid CO<sub>2</sub> from the delivery tank. The chilled CO<sub>2</sub> is then delivered directly to the CAT supercritical fluid pump. Proper cooling of the CO<sub>2</sub> before it arrives at the pump ensures that the CO<sub>2</sub> is pumped in an efficient manner that eliminates cavitation to achieve the pressures and flow rates required for supercritical fluid extraction processes. This same Chiller assembly is employed as the condenser in the CO<sub>2</sub> Recycle Loop of the Unit

**Sample Extraction Vessels:** Three 5 Liter Processing Vessels

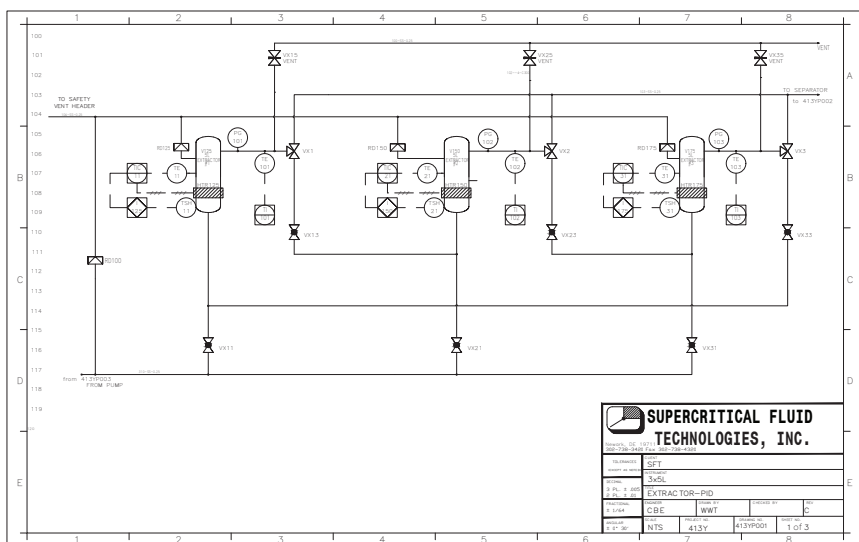
**Collection Vessel:** Externally mounted with valve for ease in extract removal

**Preheater and Extractor Temperature Control:** High-efficiency electric CO<sub>2</sub> heat exchanger to raise temperature to up to 120 °C +/- 1.0 °C. The extractor actively heated with band heater to accelerate vessel warming at startup

**Over-Pressure Safeguards:** Rupture disc assemblies

**Instrument Control:** Vessel and preheater temperature controlled by Allen Bradley PLC with PanelView Touchscreen. Displays Internal vessel temperature. Logic Controllers

**Power Requirements:** SFT-SP3500 will require 30 Amps of 230V three phase. The Chiller will need 20 Amps of 230V three phase



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