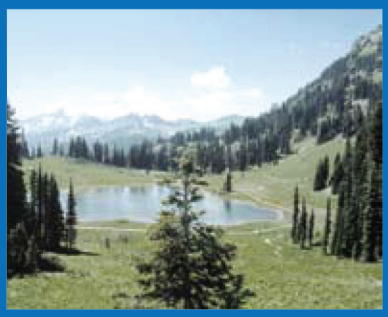
SUPERCRITICAL FLUID TECHNOLOGIES, INC.

Supercritical Fluid Extractions, Reactions and High Pressure Chemistry

SFT-130A Fully Automated Supercritical CO_2 Extractor



Innovative Leadership in Supercritical Fluids and High Pressure Chemistry

www.supercriticalfluids.com

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SFT-130A Fully Automated Supercritical CO_2 Extractor

SFT-130A SFE

- **Fully Automated, bench top SFE for Universities and Industry**
- **Programable settings for control of the BPR, Flow Rate, Pressure and Temperature**
- **Programable Extraction Procedures/Recipes**
- **Sample Vessel Volume 1000 ml (100, 250, 500 ml inserts available for smaller volume operation)**
- **Operation up to 10,000 psi (68.9 MPa) and 120°C**
- **Integrated Fluid Preheater**
- **Options include Full CO_2 Recycle and Co-Solvent Addition Modules**

The SFT-130A SFE is an advanced supercritical fluid extraction system. It combines the easy operation of a bench top SFE with many features typically found only in larger and more costly pilot scale systems. The SFT-130A is well suited for a variety of applications from basic research to process development. This SFE system was developed to investigate the application of supercritical fluid extraction to a wide variety of analytical and material processing challenges.

In addition to its many industrial uses, the SFT-130A is ideal for colleges and universities. It is an affordable SFE for both teaching and research laboratories. It possesses the features required by researchers who require automation of key processing parameters for unattended operation. Operating pressure up to 10,000 psi (68.9 MPa) and at temperatures ranging from ambient to 120°C make the SFT-130A suitable for almost any research project.

The SFT-130A is equipped with a 1000ml sample vessel. Optional vessel inserts permit operation at reduced volumes of 100, 250 and 500ml. Given this versatility, the SFT-130A is well-suited for both small, analytical scale applications and for slightly larger ones to extract very low levels of key components from a material or to process larger quantities of materials than are possible on the traditional analytical scale.

Internal temperature stability, an essential processing parameter, is ensured by the system's integrated pre-heater. The pre-heater provides the fluid to the main pressure vessel at a consistent temperature. This precise control guarantees consistent results from run to run.

The SFT-130A is supplied with a steady stream of high-pressure liquid CO_2 by an integrated, high performance, pneumatically driven piston pump that rapidly compresses liquid CO_2 drawn from a standard laboratory cylinder and delivers it at the pressures required for SFE (up to 10,000 psi). The unit operates in a constant pressure mode, maintaining a set pressure as the CO_2 extract flows out of the system, through an automated back pressure regulator (BPR), into the collection assembly.

A PLC monitors and controls all functions of the SFT-130A. This provides for fully automated cycle controls, data logging, safety alarms, history recording, and creating processing recipes. Automation of the BPR provides precise control over the flow rate of the expanding gas. This is essential for obtaining highly reproducible results. Flow rates up to 50 ml/min liquid CO_2 are achieved under typical operating conditions (18mls/minute @ 10,000psi).

Extract from a ¼" outlet tube is collected in a vented sample container. Standard sizes range from 50 ml to 1 liter. Co-solvent addition modules are available for the SFT-130A and can be acquired along with the system or added later. Sample containment bags and baskets are recommended to make changing sample easy.

The SFT-130A SFE Unit can be fitted with an optional CO_2 Recycle Module that is capable of recycling >95% of the CO_2 used in an extraction process and reusing it many times.

One Innovation Way • Newark, DE 19711

SFT-130A SCF Extractor Features

- Overall Dimensions: 19.5in x 19.5in x 19.5in (49.5cm x 49.5cm x 49.5cm)
- Weight: 77 lbs. (35 kgs)
- Fully Automated Cycle Controls - “Set it and forget it” extraction cycles
- Automatic BPR: Controls flow precisely; heated up to 200°C; Resistant to blockage.
- Fluid Preheater: Improves temperature consistency of the fluid by heating the fluid before it reaches the main sample vessel
- Over Pressure Safeguard; High / Low pressure alarms and a vented rupture disc.
- Extract Collection: Externally mounted. 50ml - 1 Liter Collection Bottles.
- Optional Co-solvent Addition: Doping or direct, in-line metered addition.

Utilities Required

- 110/240VAC single-phase @ 15-10amps (Plugs into standard outlet)
- Compressed Air: 90-140 psi @ 3.5 SCFM
- Liquid CO_2 source (room-temperature or warmer siphon tank)
- Safe CO_2 vent location for process and safety line

SCF High Pressure Air-Operated Pump

- 0.5 ml Displacement (per stroke)
- Integrated Solid-State Cooling prevents cavitation (no separate glycol-filled chiller required)
- 50 mls/min Maximum CO_2 Flowrate Design @ 5000psi (18mls/min. at 10,000psi)

1 Liter Sample Extraction Vessel

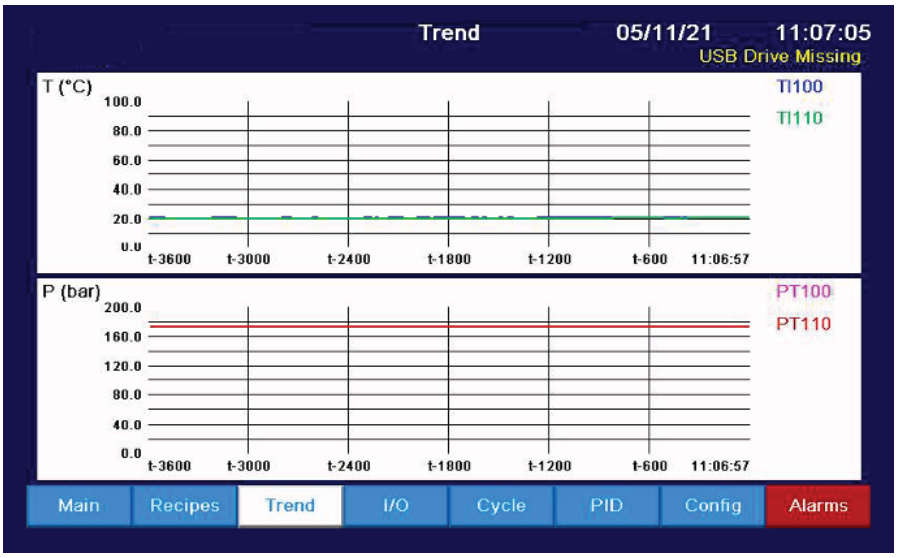
- 2.98” (76mm) Internal Diameter; 8.75” (222mm) Internal Length
- 17-4-PH Stainless Steel Construction
- Hand-Tight Top Closure
- PTFE U-cup Top Closure Seal
- Operates up to 10,000psi (689bar) with Rupture-Disc Safety Feature
- Optional Vessel volume reduction inserts for 100ml, 250ml, and 500ml operation

Controls: Allen-Bradley PLC/Allen Bradley PanelView

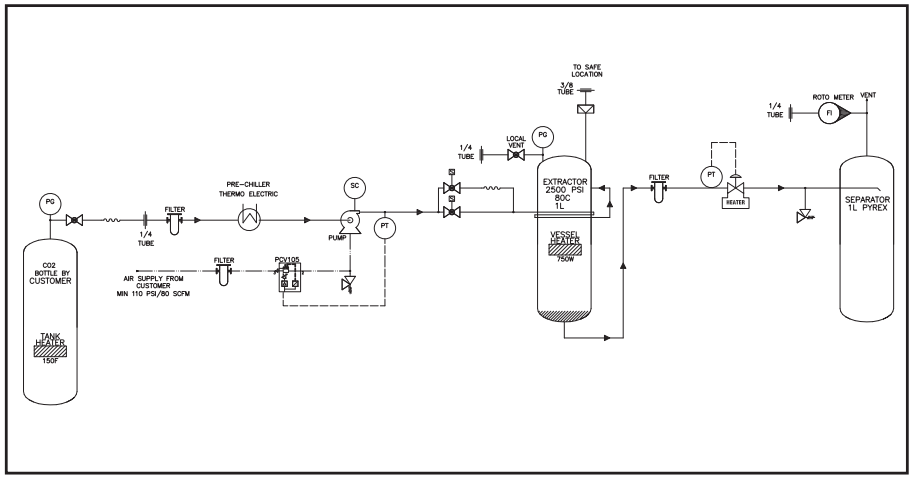
- Model 2080-LC-20QBB
- 7” Color Screen
- FTP Server for Datalogging, Alarm, History, and Recipes
- VNC Server for Remote Access
- Email alarm feature option
- PID Heater control via SSR’s
- Automated Back Pressure Regulator/Tescom 0.00725 Cv
- Fully Automated Cycle Controls

Optional CO_2 Recycle Module

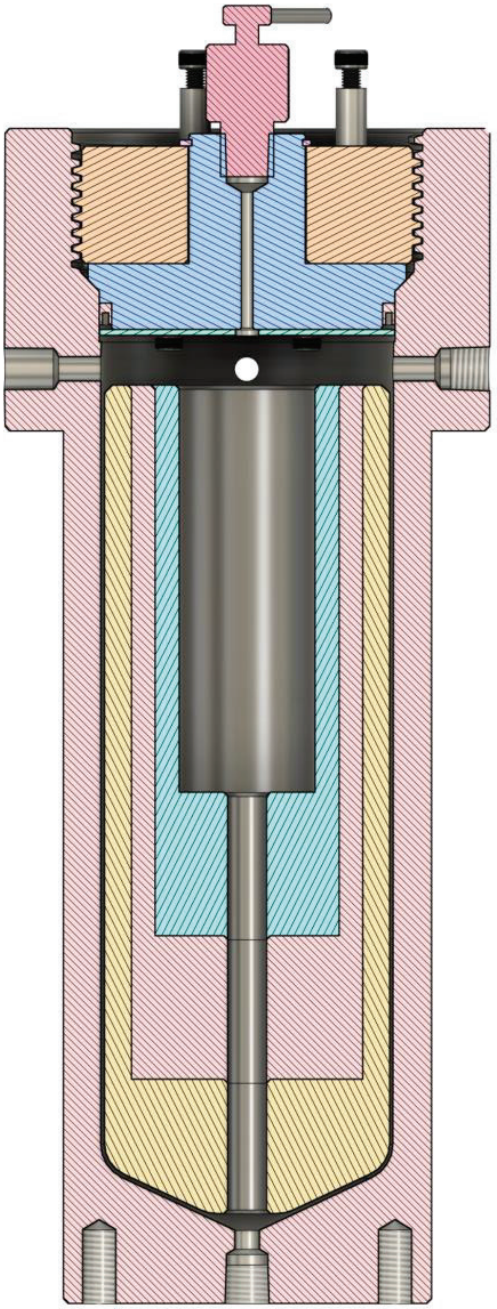
- **Recycles up to 150 grams of CO_2 per minute**
- **Unit has 1.5L separator vessel**
- **Filter is 1-micron Sintered SS to allow for cleaning**
- **Collection Assembly has a bottom valve to drain low viscosity materials during a run**
- **Accumulator volume 2,250ml of liquid CO_2**
- **Sight Glass to allow for observation of liquid CO_2 level**
- **Thermoelectric Peltier Cooling Assembly provides final cooling of condensing CO_2 and heat material entering separator**
- **Electrical requirements: A standard 115/220VAC, 50/60Hz single phase wall outlet**



Processing Trend Logging with Automated Controls



SFT-130A Extractor Flow Diagram/P&ID



1000ml sample Vessel with 100ml, 250ml, and 500ml Volume reduction inserts

P/N: SFT-130A

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