



SUPERCritical FLUID TECHNOLOGIES, INC.

Supercritical Fluid Extractions, Reactions and High Pressure Chemistry
www.supercriticalfluids.com

SFT-110 Series SFE Systems



*Innovative Leadership in Supercritical Fluids
and High Pressure Chemistry*

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SFT-110

超临界萃取（清洗、干燥）仪

SFT-110XW



桌面型超临界萃取（清洗、干燥）仪，主要面向大学、研究所及企业研发中心：

- 萃取釜体积：
 - SFT-110 配备 5, 10, 25, 30, 40, 50, 100ML
 - SFT-110XW 配备5, 10, 25, 30, 40, 50, 100, 200, 300, 500, 1000ML
- 平行操作釜体设计：
 - SFT-110 单釜位操作
 - SFT-110XW 单釜位，平行2釜位，平行3~5釜位操作
- 最高操作压力：10,000PSI（68.9MPa）
- 操作温度：200℃，250℃，最高至300℃
- 温度压力PID控制、数字显示
- 电动二氧化碳高压泵，配备Peltier电子制冷系统



SFT-110 (XW) 超临界二氧化碳萃取仪简介

超临界二氧化碳流体之优点

SFT-110是一款经济实惠的超临界流体萃取仪，主要应用于实验室可行性研究。对样品的需求量较少，因此可重点应用于高等学校的科研、研究所及企业研发中心对高附加值产品的开发研究。

二氧化碳超临界萃取的基本原理：将超临界流体与萃取物（液体或固体）充分接触，使被萃取物充分溶解在超临界流体中，然后改变温度或压力（即改变超临界流体的密度），使被萃取物析出

SFT-110为单釜位操作，最大可配备100mL的萃取釜，最高工作压力可达10,000psi（68.9Mpa），操作温度主要有200℃，250℃两种（300℃需要定制），因此应用范围广，几乎可适用于目前所遇到的所有物质的可行性研究。

与传统的容积萃取相比，使用超临界二氧化碳从植物、中草药、香料以及其它众多的天然产物中萃取有效成分具有无与伦比的诸多优点。① 萃取剂的溶解能力易于通过调节温度和压力控制；② 可在低温下操作，不破坏提取物中的活性组分；③ 可较快地达到平衡，萃取速率快，生产周期短；④ 溶剂回收简单方便，不存在残留物；⑤ 萃取剂可循环使用，不产生三废，不污染环境。

SFT-110XW可配备1~5釜位操作，最大可配备1000mL的萃取釜，最高工作压力可达10,000psi（约合68.9Mpa），操作温度主要有200℃，250℃两种（300℃需要定制），因此，特别适合于多数据快速分析，如食品、药品、土壤等大多数领域的质量检测等。

当适度提高温度和压力后，二氧化碳将成为超临界状态，此时将不再是气态或液态，被称之为“超临界态”。在这种状态下，超临界流体的溶解性具有如下特点：① 远远高于一般液体；② 随温度升高、压力降低而减小；③ 随温度、压力变化极其敏感。同时，二氧化碳被普遍选作超临界流体，还由于如下原因：作为来源广，价格低廉；不燃烧、不助燃、操作安全；无毒、易挥发、操作后残留物少；对设备无腐蚀；临界温度低。

SFT-110 (XW) 系列产品配备了釜前预热单元，使得釜内温度能够快速达到所需要的萃取温度，最大限度地防止了萃取副产物的出现，对提高产品纯度具有重要的意义。

SFT-110 (XW) 系列产品采用先进的步进电机驱动，配备先进的嵌入式电子制冷系统，可保持泵头温度低于-4℃，不需要再额外配备空气压缩机（或空气钢瓶）和外循环水浴槽，是目前全世界最为先进的增压系统。

超临界二氧化碳萃取技术已广泛应用于众多领域，如医药、食品、电子（电子元器件清洗、干燥）、天然产物（包括中医药）、烟草、纺织品染色、化工等，甚至已应用于最前沿领域的新材料合成与分析等。

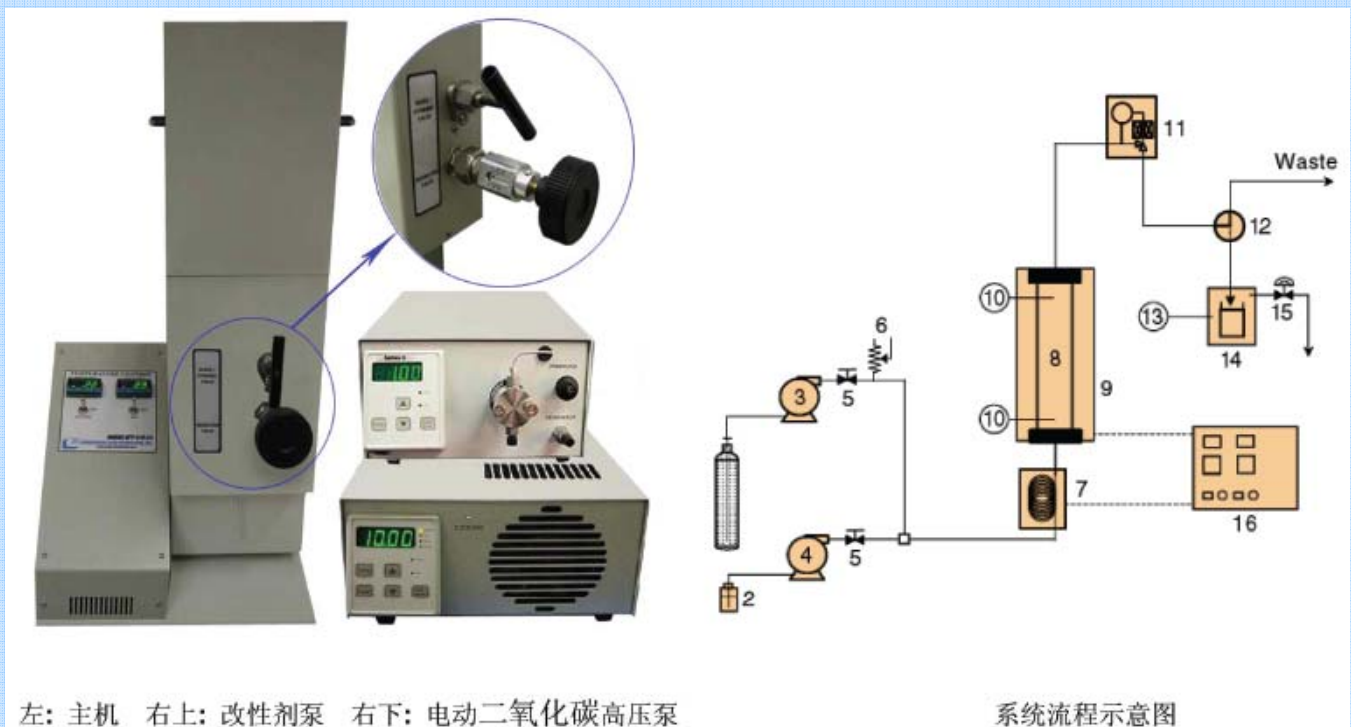


SFT-110 (XW) 系列超临界萃取 (清洗、干燥) 仪主要特点:

- **电动二氧化碳高压泵:** 采用先进的步进电机驱动, 配备先进的嵌入式电子制冷系统, 可保持泵头温度低于 -4°C 。电动二氧化碳高压泵本身可以独立工作, 不需要再额外配备空气压缩机 (或空气钢瓶) 和外循环水浴槽。
- **压力控制系统:** 操作压力 $10,000\text{ psi}$ (68.9Mpa) 压力上限, 通过前置面板控制, 具有压力高报、压力低报功能, 显示实际压力与设置压力。恒压操作模式下的**压力精度: $1\sim 2\text{psi} = 0.07 \sim 0.14\text{ Bar}$** 。该技术为SFT公司与ACCUDYNE系统公司共同持有的超临界 CO_2 设备的高精度压力控制专利。
- **流量控制系统:** (1) 二氧化碳高效精准电动泵, 实现釜前流量精准控制, T型单向阀实现 0 psi 可信的流速漂移, 前置面板流速调节, 增量为 0.01mL (液体) /min; (2) 出口带千分尺刻度的流量调节阀, 实现釜后精准流量控制。



SFT-110 (XW) 系列超临界萃取 (清洗、干燥) 仪操作流程:



左: 主机 右上: 改性剂泵 右下: 电动二氧化碳高压泵

系统流程示意图

★SFT-110XW系列产品, 还可配备2~5 釜位平行操作, 用于多样品快速检测。

**SFT-110 (XW) 系列超临界二氧化碳萃取 (清洗、干燥) 仪技术参数****SFT-110 (XW) 系列超临界二氧化碳萃取仪标准配置**

温度/压力显示:	独立的 LED 数字显示
温度范围:	常温 - 200℃、250℃ (300℃定制)
温度精度:	+/- 0.5℃
操作压力:	最高 10,000psi (68.9MPa), 前置面板控制, LED 数字显示。恒压模式
流速范围:	SFT-110: 0-25.00mL (液体) /min SFT-110XW: (1) 0-250.0mL (液体) /min (2) 0-400.0mL (液体) /min (3) 0-875.0mL (液体) /min
流量精度:	全量程+/-2%
过压报警:	高/低压报警 (PAH/PAL), 机械爆破片 (11,500psi)
增压泵:	SFT-10 电动二氧化碳增压泵, 合金泵头, 配备电子制冷, 步进电机凸轮驱动, 双球, 截止阀, 不锈钢流体管路, 防堵阀, 压力传感器。泵为连续压力模式, 带压力设定。流量自动调节来维持压力。T 型单向阀实现 0 psi 可信度的流速漂移, 进出口过滤, T 型压力传感器, 不增加系统的体积, 前置面板流速调节, 增量为 0.01 mL/min, 可设定压力上下限, 带压力、流量控制和上下限报警。 微处理器高级控制: <ul style="list-style-type: none">- 抗化学腐蚀的面板- 抗化学腐蚀的 LED 数字显示, 显示流速、压力限制- 数字步进电机, 防止流速随时间和温度漂移
出口限流阀:	最高保温温度 250℃ (300℃定制), 带千分尺刻度的流量调节阀, 实现釜后精准流量控制
预热单元:	在二氧化碳进入萃取釜之前进行预热, 可以有效改善釜内二氧化碳的温度均一性, 防止副产物的发生
萃取釜体积:	SFT-110: 5, 10, 25, 30, 40, 50, 100ML; SFT-110XW: 5, 10, 25, 30, 40, 50, 100, 200, 300, 500, 1000ML
收集容器:	外置式, 多种选择
设备尺寸:	SFT-110: 长 X 宽 X 高 = 29 X 57 X 76CM; SFT-110XW: 视配置而定

SFT-110 (XW) 系列超临界二氧化碳萃取仪选项配置

多釜位操作: SFT-110XW 可设计单釜位、2 ~ 5 釜位操作, 取决于客户对样品处理能力的要求而定



夹带剂泵: 用于在线或离线向萃取釜内添加一定量的有机溶剂, 用以改善二氧化碳萃取剂的极性, 提高对极性目标物的选择性。主要技术指标为:

- 流量: 0.01-10 mL/Min
- 最大操作压力: 10,000psi (68.9Mpa)
- 压力精度: 1% 全量程
- 流量精密密度: 0.5% RSD (100% 甲醇 @ 1000 psi)

样品框栏: 不锈钢, 30 目 (可定制), 带手提环

样品袋: 5 微米尼龙袋, 各种大小可选

浮子流量计: 0-35SLPM 可选

现场条件: 220 VAC, 50/60Hz.

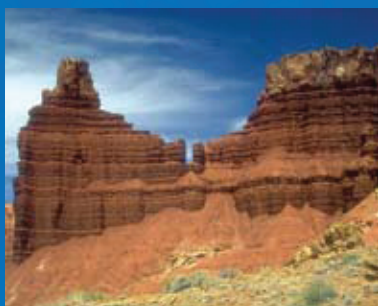
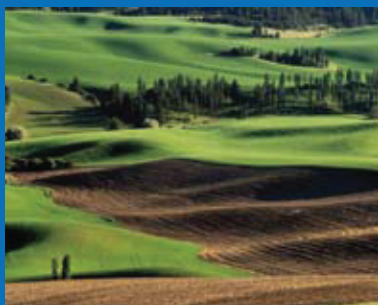
液态二氧化碳钢瓶, 带探底管。



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SFT-110

SFT-110XW Unit



Bench Top SFE for Universities and Industry

- Sample Vessel Volumes from 5 ml to 100 ml
- Up to 1000ml and Dual or Quad Vessel Configuration for Series or Parallel Operation in the SFT-110XW
- Operation up to 10,000 psi (68.9 MPa) / 250°C
- PID Control of Pressure and Temperature
- Integrated Fluid Preheater and Optional Flow Meter
- Various Extract Collection Options
- Optional Co-solvent Addition Modules



The SFT-110 and SFT-110XW Supercritical Fluid Extractors (SFE) are entry level systems which possess many features typically found in more costly SFE equipment. They may be used for a variety of applications from basic research to process development.

These SFE systems were developed for researchers who want to investigate the feasibility of applying supercritical fluid techniques to a wide variety of analytical and processing problems. In addition to numerous industrial uses, the SFT-110 and SFT-110XW are ideal for colleges and universities. They are affordable for teaching laboratories and well-suited to the needs of the serious researcher.

The SFT-110 accommodates 5 ml to 100 ml extraction vessels. It may be operated at pressures up to 10,000 psi. (68.9 MPa) and at temperatures ranging from ambient to 250°C.

The SFT-110XW accommodates 5ml to 1000ml extraction vessels. It may be operated at pressures up to 10,000 psi. (68.9 MPa) and at temperatures ranging from ambient to 250°C. It is possible to configure the SFT-110XW with the wide range of vessels volumes making the SFT-110XW well-suited to both analytical scale SFE applications and basic process development work. With a 1000ml vessel, the SFT-110XW can extract very low levels of key components from materials and process larger amounts of bulk material than would be possible with smaller, analytical scale SFE equipment. For even greater versatility, the SFT-110XW may be configured for dual vessels, in series or parallel operation.

Inside the SFT-110 series' oven, a preheater ensures that the temperature of the fluid reaching the extraction vessel(s) is controlled precisely. This is essential to obtaining accurate, repeatable results.

Both the SFT-110 and SFT-110XW incorporate the SFT-10 high performance, dual piston carbon dioxide pump which produces the high pressures required for supercritical fluid work. The pump has built-in safety precautions to prevent accidental over-pressure conditions. As an additional safety backup, a rupture disc assembly provides mechanical protection against accidental over-pressurization of the system.

Manually operated valves ensure long term, maintenance free operation. An integrated program logic controller monitors and adjusts the fluid flow rate to achieve and maintain a desired pressure set point. A PID temperature controller monitors and maintains precise fluid temperature inside the high pressure vessel.

The SFT-110 and SFT-110XW utilize the latest variable restrictor valve (back pressure regulator) technology, providing precise control over the flow rate of the expanding gas. This is essential for obtaining highly reproducible results. Flow rates can range from 0.01 to 24 ml/min (0.008 to 18 grams/min) of liquid CO₂ under typical operating conditions.

Extract collection options include: solid phase extraction (SPE) cartridges, solvent filled vessels, fractional cyclone separators, and EPA sample vials. Optional co-solvent addition modules are available for the SFT-110 and SFT-110XW. For greater versatility and ease of use, sample bags, sample baskets and flow meters are recommended.

SFT-110 Series System Specifications

Standard Configuration

Temperature and Pressure Display: Independent LED displays.

Temperature Range: Ambient to 250°C.

Temperature Precision: +/- 0.5°C.

Operating Pressure: 10,000 psi upper pressure limit.
Front keypad control, with LED display. Constant pressure mode of operation.

Flow Rates: 0.01 – 24.00 ml/min liquid CO₂ (+/- 2% accuracy).

Over Pressure Safeguard: High / Low pressure alarms and rupture disc assembly.

SFT-10 High Pressure Pump: Dual aluminum heads, furon seals and sapphire pistons, integrated thermoelectric cooling, cam-driven pump mechanism with single stepper motor drive, dual ball and seat check valves (ruby ball, sapphire seat). The pump's constant pressure mode features a selectable pressure set point. Flow rate auto-adjusts to maintain pressure.

Restrictor Valve: Heated up to 250°C; User selectable set point; Resistant to blockage.

Preheater: Improves temperature consistency of the fluid by heating the fluid before it reaches the main pressure vessel.

Extraction Vessel: Accommodates vessels ranging in size from 5 ml to 100 ml. (Up to 1000 ml for the SFT-110XW) Vessels come with 5 micron frits and are interchangeable.

Collection Vessel: Externally mounted. Many options available.

SFT-110 Dimensions: Width: 29 cm, Depth: 57 cm, Height: 76 cm.

SFT-110XW Dimensions: Width: 40 cm, Depth: 57 cm, Height: 102 cm

SFT-110 Weight (without vessel): 24 kg (52 lbs)

SFT-110XW Weight (without vessel): 28 kg (60 lbs)

Configuration Options

The SFE-110XW can be configured for a dual or quad vessel option for series or parallel operation.

Co-solvent Addition: Doping module or direct, in-line metered addition.

Interchangeable Sample Vessels: 5, 10, 25, 50 and 100 ml. Up to 1000ml for the SFT-110XW (All vessels included 5 micron frits)

Sample Baskets: SS, 30 mesh, with lids.

Sample Bags: 5 Micron Nylon, various sizes.

Flow Meter: 0 - 35 SLPM of expanded gas.

System Requirements

Power Requirements: 220 VAC, 50/60 Hz

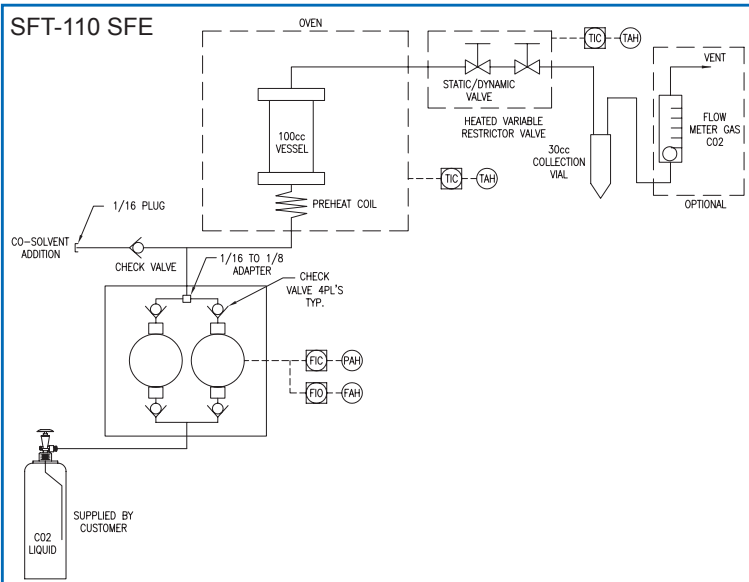
Liquid Gas Supply: Liquid CO₂ cylinder with dip tube.



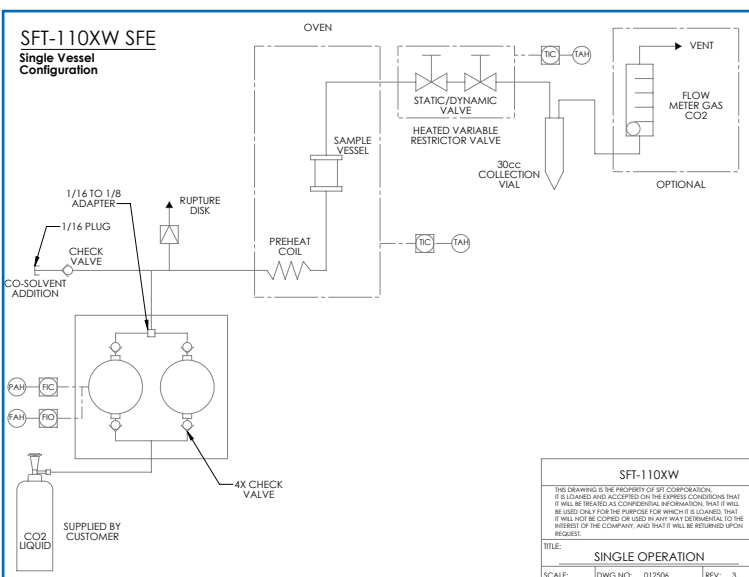
SFT-110 ▲



SFT 25ml Vessel ▲



Dual SFT-110XW ▲



Inside the Dual SFT-110XW oven ▲

