HPR 系列超临界流体萃取、（氧化）反应、清洗、干燥、相平衡多功能系统

HPR系列超临界流体
萃取、反应、清洗及干燥系统

可适用于科研及中试规模的台面式超临界流体系统

- 釜容积由5ml至8000mL可选
- 最大工作压力10,000 PSI (68.9MPa)
- 最高工作温度高达350℃
- 防爆单元：系统超压时可安全泄压，确保安全
- PID 精确控制压力及温度
- PID 精确控制高压泵的流量
- 集成式预热器及流量表
- 热电式冷却泵技术
- 多种萃取物收集方式
- 可选配共溶剂泵、分离釜
- 可选配釜体视窗（最高工作温度不超过200^{O}C)
- 可选配磁力驱动搅拌系统
- 可选配数据图像采集系统

SFT 公司制造的 HPR 系列超临界流体萃取(SFE)、（氧化）反应(SFR)、清洗(SFC)、干(SFD)燥、相平衡系统拥有多种功能，这些功能往往是更高价值的设备才具备的。作为处理各种问题的基础系统，HPR 系统从常规的分析工作到基础的工艺过程的开发，可广泛应用于多个领域。

HPR 系统是为研究超临界流体技术的可行性、以及应用到更广阔的分析和处理领域的人员定做的。除了很多工业用途外，HPR 系统主要适用于各类院校；同时可用于教学实验室和精密研究中。

HPR 系统可选配 5ml 到 8000ml 的釜体；操作压力至 10000psi，温度从常温至 350℃；可同时选配四个釜。宽范围的釜体体积使这套系统即可用于超临界分析应用实验，也可用于基础工艺过程的开发。

使用 8000ml 的釜体容器，HPR 系统可以萃取得到原料中含量很低的组分，更可以提供仅供分析用的小设备无法达到的处理量，以实现小批量的生产。在 HPR 主机箱体里，预热器用以保证到达萃取容器的流体温度被精确控制。这对获得精确并可重现的结果非常重要。

HPR 系统配置了一台高运行能力的双活塞泵。它可以提供超临界萃取工作所需的高压。这套系统有内置的安全措施，可以防止超高压和超高温。当突发问题时，爆破片汇集提供机械保护，防止系统的突然增压。

手动阀确保一个长期稳定、无需维护的操作过程。一套完整的程序逻辑控制器监控和调节和萃取容器内的流量压力到达和维持一个期望的控制点。PID 温度控制器监控和维持高压容器内精确的流体温度。

HPR 系统使用了最新技术的可调限流阀（背压调节器），从而保证气体膨胀后精确流量控制。此限流阀上刻有刻度，可以对调节的幅度进行量化；这对可重现的准确的实验结果非常重要。一般情况下，使用 500mL 及更小的釜体，液体 CO2 流速为 0.1 到 25ml/min (0.008 to 18 克/分钟)。在使用更大的釜体时，液体 CO2 流速为 0.1 到 2500ml/min (0.008 to 2000 克/分钟)。CO2 为超临界系统最常用的溶剂，将系统在稍加改造后，就可灵活地使用 CO2 之外的不同溶剂。

萃取物的收集方式可选：

- 固相萃取框篮
- 盛满溶剂的容器
- 旋风分离器
- EPA 物料收集瓶
-

其他选项包括共溶剂添加模块及釜体视窗 (最高工作温度不超过 200^{O}C)，以及磁力驱动搅拌系统。

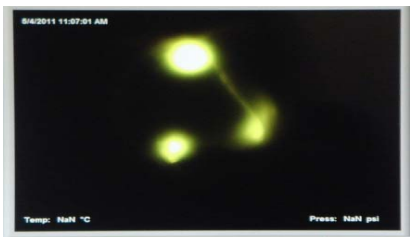
HPR-Series SCF System Specifications

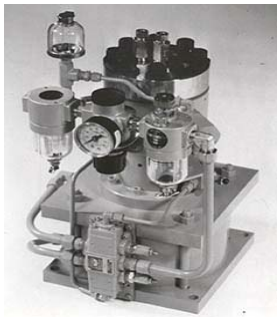
标准配置

温度和压力显示：独立的 LED 显示。
温度范围：常温到 350℃
温度精确值：±0.5℃。
操作压力：超过 10,000psi 时，前控制键控制，LED 显示。操作恒压模式。
在 10,000Psi（68.9Mpa）压差下流量:

- 在釜体容积不大于 500mL 时，)液体 CO_2 流量为 0.01-25.00 ml/min，即 0.008 to 18 克/分钟。 (精度 +/- 2%)，单向阀可实现 0 psi 可信的流速
- 在使用 500mL 以上的釜体时，液体 CO2 流量为 0.1 到 2500ml/min，即 0.008 to 2000 克/分钟。(精度+/- 2%)

过压保护装置：高/低压报警和爆破片保护。
电动二氧化碳高压泵（选项）：铝合金头，Furon 的密封和蓝宝石活塞，热电冷却，步进电机，双球，截止阀（红宝石球，蓝宝石座），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。
电子制冷系统：电子制冷方式保持泵头温度低于-4°C，配备蓝光指示灯用于确认电子制冷系统工作状态
产品符合：RoHS《关于限制在电子电器设备中使用某些有害成分的指令》证书
限流阀：可加热至 250℃。防堵。**带千分尺计量刻度**
预热：提升流体温度的连续稳定性，以保证流体达到釜体时温度均衡。





釜体容积

- 50, 100, 500 mL
- 1, 2, 5, 8 L

釜体带有 5 微米的过滤器及 CO_2 流向控制器，釜体可互换，并可平行操作。

并联及串联操作可选釜体容积：

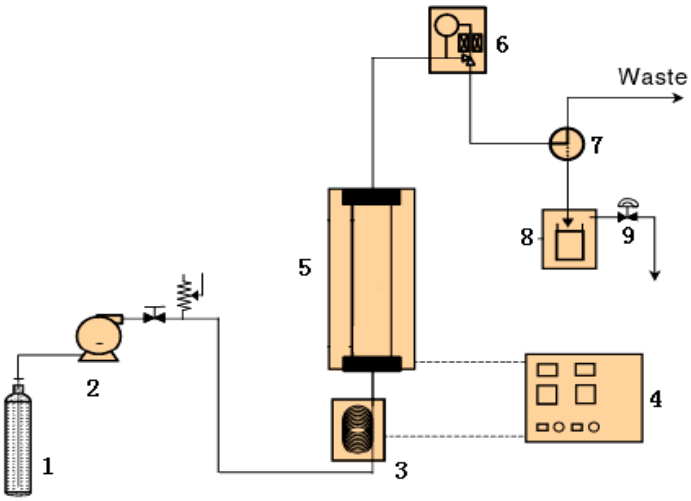
- 10, 25 50, 100, 500 mL
- 1, 2, 5, 8 L

尺寸：依据配置而定。
重量：依据配置而定。

可选配置

共溶剂添加：添加模块或直接在线计量添加。
平行操作釜：体积可选 10mL to 8L （带有 5 微米的过滤器).
分离釜：分离釜体积 10mL to 1L
样品筐：不锈钢筛网，带盖
冷阱：用于收集小分子量萃取物的收集
气体流量计：用于测量 CO2 时实气体流量
搅拌器：磁力驱动搅拌系统
数据及图像采集系统：Data Acquisition System 可实时收集并存储系统数据与图像，并实时输出

电力要求：220V，50/60Hz
液化气体供给：带汲取管的液体 CO2 钢瓶



HPR-Series SCF Extraction, Reaction, Cleaning and Drying System

HPR-Series SCF Extraction, Reaction Cleaning and Drying System

Bench Top SCF units for Universities and Industry

- Sample vessel Volume from 5mL to 8000mL
- Operating pressure up to 10,000 psi (68.9Mpa)
- Operating Temperature up to 350^{O}C
- Safety Rapture Disc Assembly
- PID Control of Pressure and Temperature
- PID Control of Flow Rate for SFT-10 pump
- Integrated Fluid Preheater and Flow Meter
- Thermoelectrically Cooled Pump Technology
- Various Extract Collection Options
- Optional Co-Solvent Addition Modules
- Optional Vessel Windows (up to 200^{O}C)
- Optional Magnetic Drive Mixing
- Optional Data and Drawing Acquisition System

The SFT-HPR-Series Supercritical Fluid Extraction (SFE), Reaction (SFR), Cleaning (SFC), and Drying (SFD) systems are entry level system which possesses many features typically found in more costly the equipment. It may be used for a variety of applications from routine analytical work to basic process development.

The SFT HPR-Series was developed for people who want to investigate the feasibility of applying supercritical fluid techniques to a wide variety of analytical and processing problems. In addition to its numerous industrial uses, the SFT HPR-Series is well suited to the needs of colleges and universities. It is so affordable that it may be incorporated into teaching laboratories. At the same time, it is capable enough to be used for serious research.

The SFT HPR-Series accommodates 5 ml to 8000 ml extraction vessels. It may be operated at pressures up to 10,000 psi. (68.9 MPa) and at temperatures ranging from ambient to 350°C. It is possible to have up to four vessels installed. The wide range of vessel volumes available makes the SFT HPR-Series well suited to both analytical scale SF applications and basic process development work. With a 8000 ml vessel, the SFT HPR-SERIES 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 SF equipment. Inside the SFT HPR-Series oven, a pre-heater ensures that the temperature of the fluid reaching the extractions vessel is controlled precisely. This is essential to obtaining accurate, repeatable results.

The SFT HPR-Series utilizes a high performance, dual piston pump which produces the high pressures required for supercritical fluid work. The system has built-in safety precautions to prevent accidental over-temperature or overpressure conditions. As an additional safety back up, 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 the precise fluid temperature inside the high pressure vessel.

The SFT HPR-Series utilizes the latest variable restrictor valve (back pressure regulator) technology, providing precise control over the flow rate of the expanding gas. This BPR was graduated for metering and setting flow rate precisely. This is essential for obtaining highly reproducible results. Flow rates can range from 0.01 to 25 ml/min (0.008 to 18 grams/ min) of liquid CO_2 under typical operating conditions for 500mL less vessels, while 0.1 to 2500 ml/min (0.08 to 2000 grams/ min) for 500mL greater vessels. As carbon dioxide is the most commonly used solvent, the SFT HPR-Series, with some modification, allows the user flexibility to work with a variety of supercritical fluids.

Extract collection options include:

- solid phase extraction (SPE) cartridges
- solvent filled vessels
- fractional cyclone separators
- and EPA sample vials.

Optional co-solvent addition modules, Vessel Windows (up to 200^{O}C), Magnetic Drive Mixing are available for the SFT HPR-Series.

HPR-Series SCF System Specifications

Standard Configuration

Temperature and Pressure Display: Independent LED displays.

Temperature Range: Ambient to 350°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 at 10,000psi pressure difference:

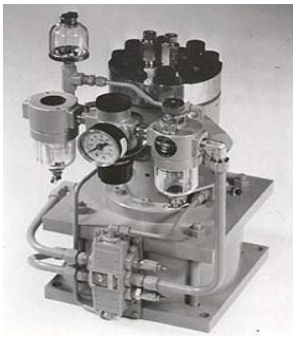
- 0.01 to 25 ml/min (0.008 to 18 grams/ min) of liquid CO_2 under typical operating conditions for 500mL less vessels, liquid CO_2 (+/- 2% accuracy). 0 psi flow shift achieved.
- 0.1 to 2500 ml/min (0.08 to 2000 grams/ min) of liquid CO_2 under typical operating conditions for 500mL less vessels, liquid CO_2 (+/- 2% accuracy)

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

Electrical Driven Diaphragm Compressor: Double ended diaphragm compressor. Dual aluminum heads, furon seals and sapphire pistons, integrated thermoelectric cooling, cam-driven pump mechanism with single stepper motor dive, dual ball and seat check valves (ruby ball, sapphire seat), stainless steel fluid path, prime-purge valve, and pressure transducer. The pump’s constant pressure mode features a selectable pressure set point. Flow rate will auto-adjust to maintain pressure. With Peltier electrical cooling at -4°C.

Restrictor Valve: Heated up to 250°C; resistant to blockage, with graduated micrometer.

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



Extraction Vessel Sizes:

- 50, 100, 500 mL
- 1, 2, 5, 8 L

Vessels come with 5 micron fritts and CO_2 flow direction controller, interchangeable or parallel operation.

Vessel Sizes for Parallel and Series Operation:

- 10, 25 50, 100, 500 mL
- 1, 2, 5, 8 L

Vessels come with 5 micron fritts and are interchangeable or parallel operation.

Dimensions: depending on the configuration

Weight : depending on the configuration

Compatible with RoHS standard

Configuration Options

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

Parallel Operation Vessels: 10mL to 8L (with 5 micron Fritts).

Sample Baskets: S/S mesh, with lids.

Cold Trap: for receiving small molecular materials

Gas Totalizer: for measuring total and on-time flow of CO_2 gas

Mixer: Magnetic Driven Mixing System

Software: Computer Data Acquisition System

Power Requirements: US 110 VAC, single phase,10 amps (International Power, 220 VAC Available)

Liquid Gas Supply: Liquid CO_2 Cylinder with Dip Tube.