SUPERCRITICAL FLUID TECHNOLOGIES, INC.
美国 SFT 公司超临界流体萃取和反应装置
www.supercriticalfluids.com

HPR 系列（超临界）高压化学反应系统

- 反应釜体积 **50ml** 至 **8 L**
- 操作压力高达 **10,000 psi (68.9 mPa)**，温度 **350℃**
- **磁力驱动搅拌**
- 安全爆破片
- 彩色触摸屏控制方式
- **RS-232** 数据输出端口
- 可选反应物添加模式、
- 可选配反应釜体视窗

配有 300ml 釜体的 HPR 高压反应系统

HPR 系列（超临界）高压化学反应系统是为研究高压化学反应或类似研究领域的研究人员设计的。无论是重复的加压化学合成、实验室教学、还是工艺过程的开发，HPR 系列都能很好的满足您的需要。

HPR 系列反应器的规格尺寸从 50ml 到 8L，可以在 10000psi 和 350℃情况下操作。还有两种标准压力容器可供选择。螺栓密闭的操作条件为 2350psi 和 350℃。手动密闭的操作条件为 10000psi 和 200℃。其他特殊要求的容器也是可行的。

反应器装有磁力驱动的双叶轮，以保证最佳混合。所有的高压组件为兼容 ASME 设计，并且有爆破片作为安全措施。台式实验室设计为重复使用提供了便利的需求。一些例子包括：催化反应的研究，聚合，氢化，氧化，异构化，脱氢。所有尺寸的反应器均已设计制造成易连接设备，与其它分析仪器及设备的连接非常方便。这些反应器简洁，很容易放入通风橱。模块化设计使其配置调整更简单和有效，满足不同用户的不同要求。

所有的功能参数通过一个彩色触摸屏控制：闭环温度控制，闭环速度控制，压力指示，超高温控制，程序温度设置和速度搅拌器。RS—232 信息端口提供将数据输出到外接的计算机。

HPR 系列反应器的可选设备包括：容器视镜，进/出料口，冷却盘管，进样环路，试剂添加单元。

适用领域

烷化	氨化	生物工艺学	羟化作用	催化还原	发酵	卤化
水解	异构化	硝化氧化	聚化	氢化和脱氢	有毒物质的处理	

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HPR系列高压化学反应系统技术配置

反应容器

压力容器尺寸：50，100，300，500，1000，2000，4000，8000ml
压力范围：最高到 10000psi
压力容器材质：所有与物料接触部分是 316 或 17-4-PH 不锈钢
内部尺寸（门闩开合式）：
（2350psi 和 350℃操作条件下）：
50ml：2.0inch×3.45inch
100ml：1.5inch×3.80inch
300ml：2.63inch×3.50inch
500ml：2.63inch×5.80inch
1000ml：3.63inch×6.29inch
2000ml：3.63inch×11.95inch
4000ml：5.31inch×11.75inch
8000ml：6.5inch×14.0inch
内部尺寸（手动开合式）：
（10,000psi 和 200℃操作条件下）：
300ml：2.12inch×6.0inch
500ml：2.12inch×9.0inch
1000ml：3.0inch×8.8inch
2000ml：4.0inch×9.8inch
4000ml：5.5inch×10.5inch
8000ml：5.5inch×21.0inch

主要密封：自带金属密封或各种低温操作的 O 型圈
支架：防腐蚀支架
电力要求：220V/60Hz（国际电源通用）

搅拌系统

搅拌器：Dyna/Mag 型 MM—016 磁性搅拌器，6 in-lbs。扭矩，1/4HP Dyna/Mag 型 MM—016 磁性搅拌器，6 in-lbs。扭矩，1/2HP
驱动器：直流速度驱动，115/1/60
叶轮：标准件 gaspersator，可选
运行速度：0—2500RPM，随课题的条件
操作压力选项：2350psi，6000 psi，及 10000 psi

标准特性

加热器：外包陶瓷不锈钢加热器，115—230V，50—60Hz
处理管：1/8” OD 压缩装置，2 路直管
（1/4”OD 压缩装置，2 路直管）
安全头：联合爆破片
热电偶套管：1/8 OD 压缩装置

容器端口设定	尺寸/位置
搅拌器：	顶部，中心
爆破片：	1/4’’圆锥装置
工艺连接：	1/8’’OD 压缩装置
取样管：	1/8’’OD 压缩装置
冷却盘：	1/8’’OD 压缩装置

控制器规格

系统运用一个微控制器执行 PID，互锁。微控制器和电源控制部分在工作台上的模块里。数字显示和按钮在控制柜前面的操作面板上。

- 密闭的温度控制回路
- 密闭的搅拌速度控制回路
- 压力指示（包括传感器）
- 超温控制
- 温度和速度程序（5 段）
- 温度，速度，压力在屏幕上显示
- PID 自动调节
- 温度，速度，压力警报，同时保存报警记录
- RS—232 信息端口

可选零件（不一定适用于所有釜体）

冷却盘：1/8’’OD U 型管
取样管：1/8’’OD 管
额外的端口
窗口
内部挡板

SUPERCRITICAL FLUID TECHNOLOGIES, INC.
Supercritical Fluid Extractions, Reactions and High Pressure Chemistry
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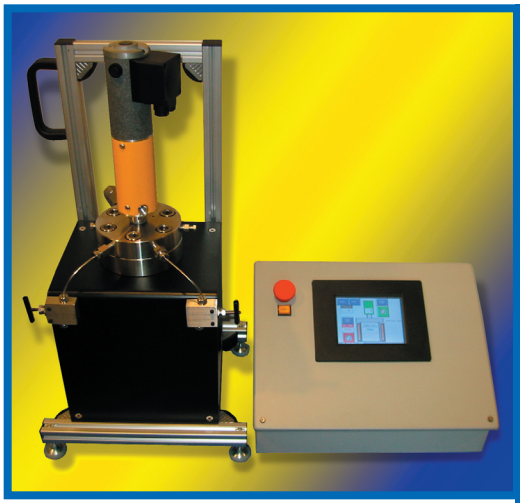
HPR-Series High Pressure Chemical Reactors



▲ *HPR-Series Reactor with 300ml vessel*

- Stirred Reactor Vessel from 50ml to 8 Liter Capacity
- Operate up to 10,000 psi (689 Bar / 68.9 mPa) and 550°C
- Magnetic Drive Mixing
- Safety Rupture Disc Assembly
- Integrated Controller with Color Touch Screen
- Data Export via an RS-232 Communications Port
- Optional Reagent Addition Modules
- Optional Vessel Windows

The HPR-Series of pressure chemical reactors is designed for researchers who are interested in investigating the feasibility of pressurized chemical reactions or processing problems in their laboratories. Whether it is repetitive pressurized laboratory chemical synthesis, teaching laboratory applications, or process development, the HPR-Series is an excellent unit for your application needs.

The HPR reactors range in size from 50 ml to 8 liters and may be operated up to 10,000 psi and 350°C. Two standard pressure vessel types are available. Bolted closures may be operated up to 2350 psi and 350°C. Hand-tight closures may be operated up to 10,000 psi and 200°C. Other custom vessels for specialized applications are available.

The reactors are equipped with magnetically coupled impellers for optimal mixing. All high pressure components are ASME compliant design (code stamp available) and protected by a rupture disc for safe operations. These laboratory bench top models are ideal for applications where repetitive use makes convenience a necessity. A few examples include: catalytic studies, polymerization, hydrogenation, oxidation, isomerization, and dehydrogenation. All size reactors are supplied as ready-to-use instruments requiring only utility connections prior to operation. The reactors are compact instruments that fit easily into a fume hood. Their modular design makes it easy and cost effective to alter the unit's basic configuration, adapting it to meet new or evolving application needs.

All functions are controlled by an integrated processor with a full color touch screen: Closed loop temperature control, closed loop speed control, pressure indication, over-temperature limit control, ramp/soak programming of temperature and mixer speed. An RS-232 communications port provides the ability to export data to an external computer.

Options for the HPR Series Reactors include: vessel windows, additional ports, cooling coils, sample loops, baffles, and reagent addition modules.

Areas of Investigation

- Alkylation
- Amination
- Biotechnology
- Carboxylation
- Catalytic reduction
- Fermentation
- Halogenation
- Hydrolysis
- Isomerization
- Nitration
- Oxidation
- Polymerization
- Hydrogenation and dehydrogenation
- Toxic/hazardous substance processing

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HPR – Series Chemical Reactor Specifications

Reactor Vessel Assembly

Pressure Vessel Sizes: 50, 100, 300, 500, 1000, 2000, 4000, and 8000 ml

Pressure Rating: Up to 10,000 psi (689 Bar and 68.9 mPa) @ 550°C

Pressure Vessel Material: 316 or 17-4-PH stainless steel on all wetted parts

Internal Dimensions (Bolted Closure):

(Operation up to 2350 psi @ 350C)

50 ml: 2.0 inch ID x 3.45 inch IL

100 ml: 1.5 inch ID x 3.80 inch IL

300 ml: 2 .63 inch ID x 3.50 inch IL

500 ml: 2.63 inch ID x 5.80 inch IL

1000 ml: 3.63 inch ID x 6.29 inch IL

2000 ml: 3.63 inch ID x 11.95 inch IL

4000 ml: 5.31 inch ID x 11.75 inch IL

8000 ml: 6 .50 inch ID x 14.0 inch IL

Internal Dimensions (Hand-Tight Closures):

(Operation up to 10,000 psi @ 200C)

300 ml: 2.12 inch ID x 6.0 inch IL

500 ml: 2.12 inch ID x 9.0 inch IL

1000 ml: 3.0 inch ID x 8.8 inch IL

2000 ml: 4.0 inch ID x 9.8 inch IL

4000 ml: 5.5 inch ID x 10.5 inch IL

8000 ml: 5.5 inch ID x 21.0 inch IL

Main Seal: Self-energizing metal seal or various o-ring materials for lower temperature operation

Support Structure: Corrosion resistant bench stand

Power Requirements (US): 220 VAC/60Hz (International power rating available).

Agitator Drive Assembly

Mixers: Dyna/Mag model MM-006 magnetic drive mixer, 6 in-lbs. torque, 1/4 HP Dyna/Mag model MM-016 magnetic drive mixer, 16 in-lbs. torque, 1/2 HP

Drive: DC variable speed drive, 115/1/60

Impeller: Gaspersator standard, options available

Operating Speed: 0-2500 RPM, subject to process conditions

Operating Pressure Options: 2350 psi, 6,000 psi, and 10,000 psi

Standard Features

Heater: Stainless steel sheathed ceramic heater, 115-230 VAC, 50-60 Hz.

Process valves: 1/8" OD Compression Fitting, 2 way straight valves (1/4" OD Compression Fitting, 2 way straight valves)

Safety Head: Union style with rupture disc

Thermowell: 1/8" OD Compression Fitting

VESSEL PORTS	SIZE / LOCATION
Agitator:	Top head, center
Rupture disc connection:	1/4" Cone Threaded Fitting
(2) Process connection:	1/8" OD Compression Fitting
Sampling tube:	1/8" OD Compression Fitting
Cooling coil: in and out	1/8" OD Compression Fitting

Controller Specification

The unit utilizes a microcontroller to perform all PID, ramp/soak, and interlock functions. The microcontroller and power control components are located in a module which may reside on a benchtop. The digital displays and pushbuttons are located on the operator panel on the face of the cabinet.

- Closed Loop Temperature Control
- Closed Loop Agitator Speed Control
- Pressure Indication (including transducer)
- Overtemperature Limit Control
- Ramp Soak Programming of Temperature and Speed (5 ramp/soak segments)
- Temperature, Speed and Pressure on Screen Plotting
- PID Autotuning
- Temperature, Pressure and Speed Alarms with Alarm History Storage
- RS-232 Communications Port

Optional Accessories (may not be available in all vessels)

Cooling coil: 1/8" OD tube, U shaped

Sample tube: 1/8" OD tube

Additional ports

Windows

Internal baffles

Custom Design for feasible Request