



HPR-Series High Pressure Chemical Reactors



- Stirred Reactor Vessel from 50 ml to 4 Liter Capacity
- Operate up to 10,000 psi (689 Bar / 68.9 MPa) and 350°C
- Magnetic Drive Mixing
- Safety Rupture Disc Assembly
- Integrated Controller with Color Touch Screen
- Data Export via a Flash Drive Communications Port
- Optional Reagent Addition Modules
- Optional Vessel Windows (Up to 150°C Operation)

◀ *HPR-Series Reactor with 300 ml vessel*

The HPR-Series of High 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-Series Reactors range in size from 50 ml to 4 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 2,350 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 operation. 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. A flash drive communications port provides the capability 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
- Supercritical Fluid Reaction Chemistry

HPR-Series High Pressure Chemical Reactor Specifications

Typical Reactor Vessel Assembly

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

Pressure Rating: Up to 10,000 psi (689 Bar and 68.9 MPa) at 350°C

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

Internal Dimensions (Bolted Closures):

(Operation up to 2,350 psi at 350°C)

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

Internal Dimensions (Hand-Tight Closures):

(Operation up to 10,000 psi at 200°C)

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

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

Support Structure: Corrosion resistant bench stand

Power Requirements: 220 VAC, 50/60Hz

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: 0-2,500 RPM, subject to process conditions

Operating Pressure Options: 2,350 psi; 6,000 psi and 10,000 psi

Standard Features

Heater: Stainless steel sheathed ceramic heater, 220 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: 1/8" OD Compression 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 Specifications

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 display 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
- Flash Drive Communications Port

Optional Accessories

(may not be available in all vessels)

Solvent/Reagent Addition Pumps

Supercritical Carbon Dioxide Pump

Cooling coil: 1/8" OD tube

Sample tube: 1/8" OD tube

Additional ports

Windows

Internal baffles