Parr 最新推出为用户特制反应釜体系

--- 按用户技术要求及独特应用而制造的反应器

系统特点 **Featured Systems:**

- 流化床反应器 **Fluidized Bed Reactors**
- 生物燃料及石油燃料代用品研究系统 **Bio-Fuels and Alternative Fuels Research Systems**
- 气-油合成系统**GTO (Gas-To-Oil) System**
- 组合化学和高通量反应系统**Combinatory Chemistry & High-Throughput Screening**
- 超临界萃取及反应系统**Supercritical Fluids**

Parr Instrument Company has invested heavily in new technology, new machinery and new software. We have created a "mass customization" process that allows us to progress from a new design to manufacture with a high degree of speed, automation and economy.

Mass Customization

Most of our customers have unique needs, proprietary processes and in some cases, design constraints. Our standard products come with a large variety of options and accessories to help meet those needs. But if you need a higher pressure, higher temperature or a different volume, we can usually do that too. We are very experienced at combining feed systems with batch or continuous flow reactors, adding product handling options and a variety of detectors for analysis of the results. Our controllers can automate the process, control individual components, datalog and archive the data. This is called mass customization.

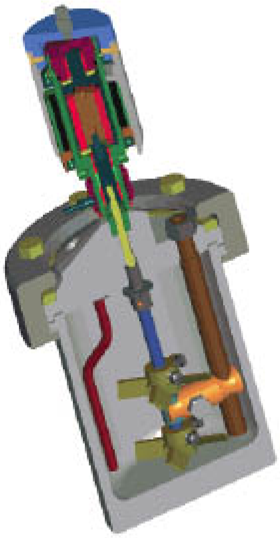
3-D CAD System

This system allows us to create new designs or modify existing ones with speed and accuracy. You can "see" what the product will look like, rotate it, see inside and check for clearances. It is a virtual prototype.

Parr Reactor Systems can simply be a starting point for your individual laboratory research requirements. This hinged split-ring reactor was customized with viewing ports for viewing the reaction process from several different angles.

Parr utilizes the latest technology in milling and manufacturing techniques to produce your custom system to the highest level of precision possible in the field today.

State of the Art Mill/Turn Machining



Above is a simple example of the power of our 3-D CAD system. We are able to set the entire apparatus in motion from any angle or sliced at any axis.

Centers

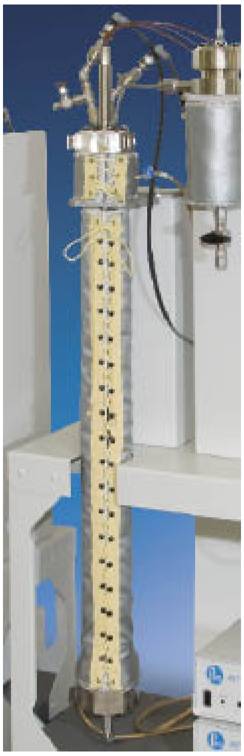
CAD designs can be automatically translated into machine language in our machine shop to make the item. This saves time and allows our machinists to begin the process of making the product immediately. All of the machining operations are computer controlled, including the selection of tools for all six axis of work.

New Software

We use the same software to make reactors that Boeing® uses to make airplanes. We constantly update, modify and purchase new programs to keep pace with changing needs, improve turn-around times and manage our resources efficiently.

Fluidized Bed Reactors

The Parr Fluidized Bed Reactor features the Reactor, a Heated Cyclone Separator, a Cooling Condenser, and a 600 mL Product Receiver.



(Above) The Flexible Mantle Heater attaches in two pieces and provides even heating to the entire length of the reactor.

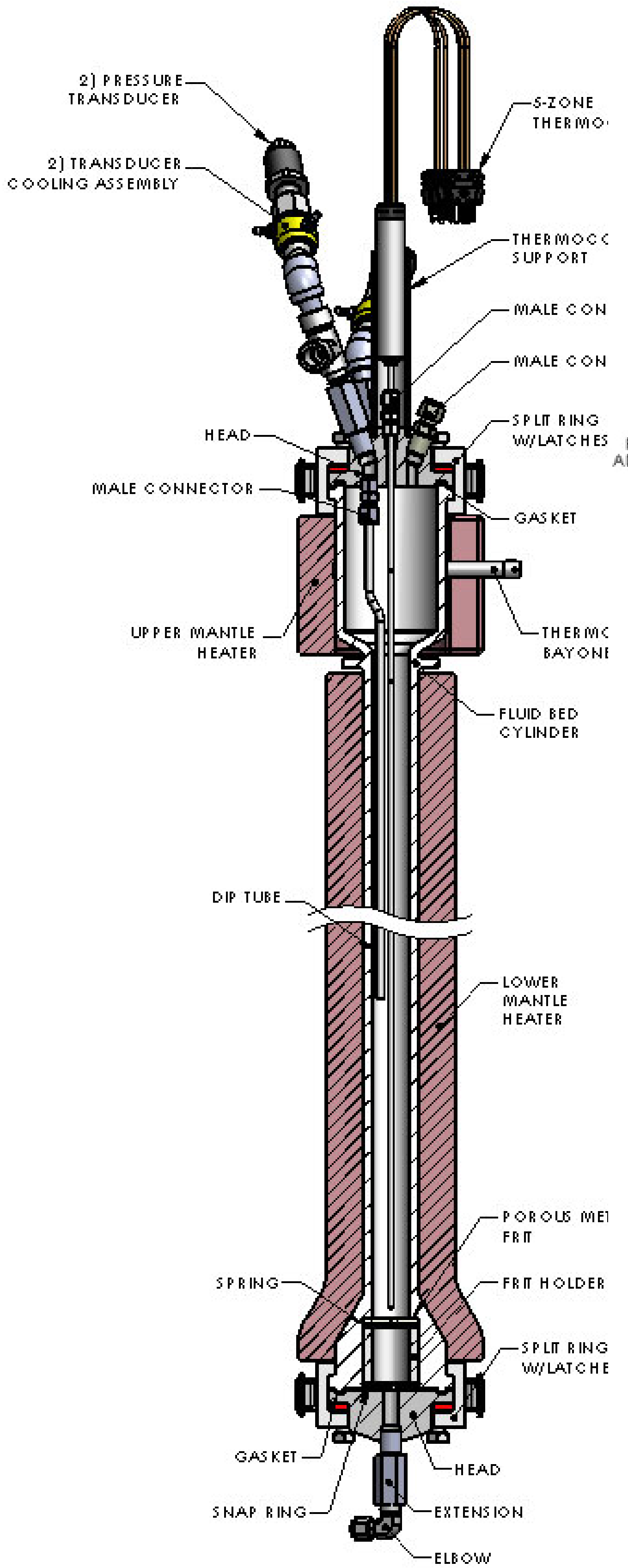
Parr fluidized bed reactors are used extensively in the chemical process industries. The distinguishing feature of a fluidized bed reactor is that the solids bed or catalytic particles are supported by an up flow of gas. This reactor provides easy loading and removing of catalyst. This is advantageous when the solids bed must be removed and replaced frequently. A high conversion with a large throughput is possible with this style of reactor. Such reactors inherently possess excellent heat transfer and mixing characteristics.

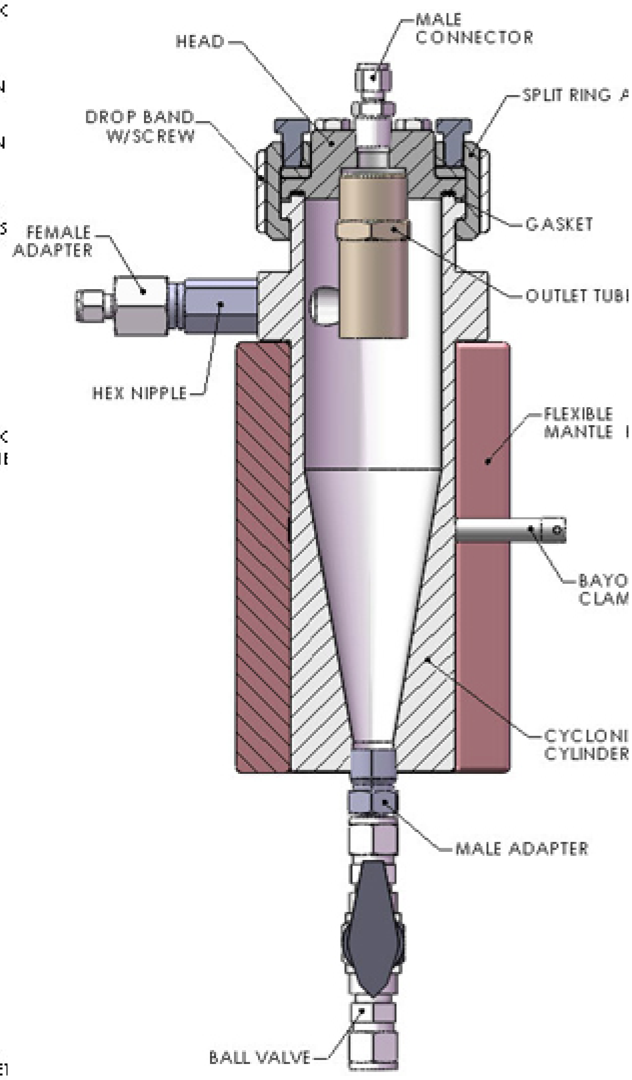
Fluidized beds have been significantly utilized in chemical processes, in which parameters such as diffusion or heat transfer are the major design parameters. Compared to packed bed, a fluidized bed has notable advantages such as better control of temperature, no hot spot in the bed, uniform catalyst distribution and longer life of the catalyst. The desirability of using fluidized beds is dependent on achieving good mixing between the solids and the suspending fluid.

Nearly all the significant commercial applications of fluidized bed technology concern gas-solid systems. Applications of fluidized bed reactors include but are not limited to Fisher-Tropsch synthesis, catalytic cracking of hydrocarbons and related high molecular weight petroleum fractions. Gasification in a fluidized bed can be utilized to convert coal, biomass and other waste materials into synthesis gas.

The reactor system pictured here includes the following key components:

- A gas handling and mixing sub-system used to blend and regulate the flow of reactant gas to the bottom of the reactor.
- The reactor is roughly one meter long with a 2.5 cm ID. The lower portion of the reactor incorporates an easily replaced porous metal gas diffusion plate and the top of the reactor widens abruptly to form a disengaging zone for the fluidized bed. Separate heaters are provided for both the main reactor and disengaging zone. A multipoint thermocouple is provided for monitoring the internal reactor temperature distribution.
- A heated cyclone separator or filter is provided immediately downstream of the reactor to capture the fines resulting from particle attrition.
- The reaction products are then cooled by a condenser and collected in a 600 mL product receiver.
- The system pressure is maintained by a dome loaded back pressure regulator.
- All system functions and parameters are monitored and maintained by a Parr 4871 Process Controller (not shown).





Cutaway of the Cyclone Separator

Cyclone Separator (PDF)

Cutaway of the Fluidized Bed Reactor

Fluidized Bed Reactor (PDF)

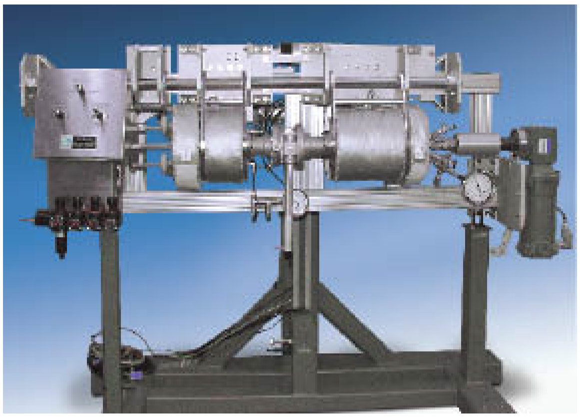
Bio-Fuels and Alternative Fuels Research Systems

Custom Reactor Systems like the above Bio-Fuels Research System are a product of collaboration between the researchers and the Engineers at Parr Instrument Company.

Parr Instrument Company manufactures non-stirred vessels for the decomposition of biomass in ammonia and steam. Parr stirred reactors, including a new horizontal reactor technology, have been designed for research processes that include hydrogenation, isomerization, and metathesis reactions. In addition, fully customizable continuous-flow tubular reactor systems have been developed with continuous reactant feed and product handling capabilities.

The above photo illustrates a complete pilot scale plant used for hydrogenating feedstock that originates from a proprietary fermentation process. The system is used to develop and optimize the process conditions necessary for a much larger demonstration-scale system, ultimately leading to full-scale production of renewable fuels.

The system is comprised of five major subsystems: from left to right, a gas and liquid feed system, the jacketed tubular reactor module including a reactant pre-heater and circulating bath, product recovery and backpressure control, an auto-sampler and a Parr 4871 Control System (not pictured). The system is completely automated and includes an auto-sampling subsystem that periodically samples the reactor output stream in order to accurately monitor product quality.



The reactor shown in the two images above and right has a five gallon capacity, and is used for stirring horizontally. Pneumatic controls on the left can tilt the system upright to open the bottom drain valve. The product is filtered and collected in a heated sample collection vessel below. This system is used for making fabric from biomass. Most synthetic fabric is made from oil.

Horizontal Reactors

Stirring biomass such as straw or grasses is not easy to do in a vertical reactor. A new technology has been developed to do it horizontally. In the system pictured to the right, a one-liter reactor can be disconnected to tilt vertically for loading or tilt horizontally for stirring. A heavy-duty stirring motor and double anchor stirrers are used. Another option would be to tilt upside down for discharge. A 4848 controller monitors the temperature and pressure and controls the stirring speed. A flexible mantle heater (not pictured) is used to obtain temperatures up to 350°C. Maximum pressure is 1900 psig for this system.

Custom Reactor Systems like the Bio-Fuels Research System at right are a product of collaboration between the researchers and the Engineers at Parr Instrument Company.

GTO (Gas-To-Oil) System

Parr GTO System

This system incorporates three tubular reactors that can be configured as required to operate in a strictly parallel fashion or in a cascade arrangement where the products from one reactor are immediately directed to a second reactor. This type of system can support reaction schemes including but not limited to the Fisher-Tropsch process, methanation reactions, steam reforming and other similar processes.

The Fisher-Tropsch process converts carbon monoxide and hydrogen into oils or fuels that can substitute for petroleum products. The reaction uses a catalyst based on iron or cobalt and is fueled by the partial oxidation of coal or wood-based materials such as ethanol, methanol, or syngas. This reaction scheme offers a promising route to producing economical renewable transportation fuels. By carefully controlling the temperature and oxygen content, resulting products can range from syngas to "green diesel".

One of the unique features of this system is a gas blending subsystem capable of mixing up to four reactant gases followed by a controlled delivery of this blended mixture to each of the three reactors via dedicated mass flow controllers.

Downstream components for each reactor include a heat exchanger/condenser, a gas/liquid separator (product receiver) and a fully automated back pressure regulator. The system includes support for introducing liquid reactants via a high pressure metering pump. The system comes completely automated with the addition of the highly versatile 4871 Process Controller (not pictured).

Combinatory Chemistry & High-Throughput Screening

16 Station Multiple Reactor System

This system is a combination of sixteen standard 4560 Mini Reactors with heaters, valves, pressure gage and rupture disc assemblies and two 4871 Process Controllers with sixteen 4875 Power Controllers. It allows the user to run multiple reactions simultaneously, applying the principles of high-throughput experimentation. Individual variables that can be controlled are gas mixtures, liquids, catalysts or other solids, stirring speed, temperature, pressure and time.

12 Station HPCL System

This system makes use of the lower cost 5500 High Pressure Compact Lab Reactors that feature a modified stand, aluminum block heaters, removable vessels and a standard gage block assembly. A control system (not pictured) automates the process, monitors the parameters and collects the data. Parr also provides a standard Multi Reactor System in the 5000MRS pictured below.

5000 Multiple Reactor Series (MRS)

The 5000 MRS comes standard with six reactors, a gas distribution panel, magnetic stirring motor and stirring bars, and a 4871 Controller to monitor and control the parameters. For more information on the 5000 MRS click here.

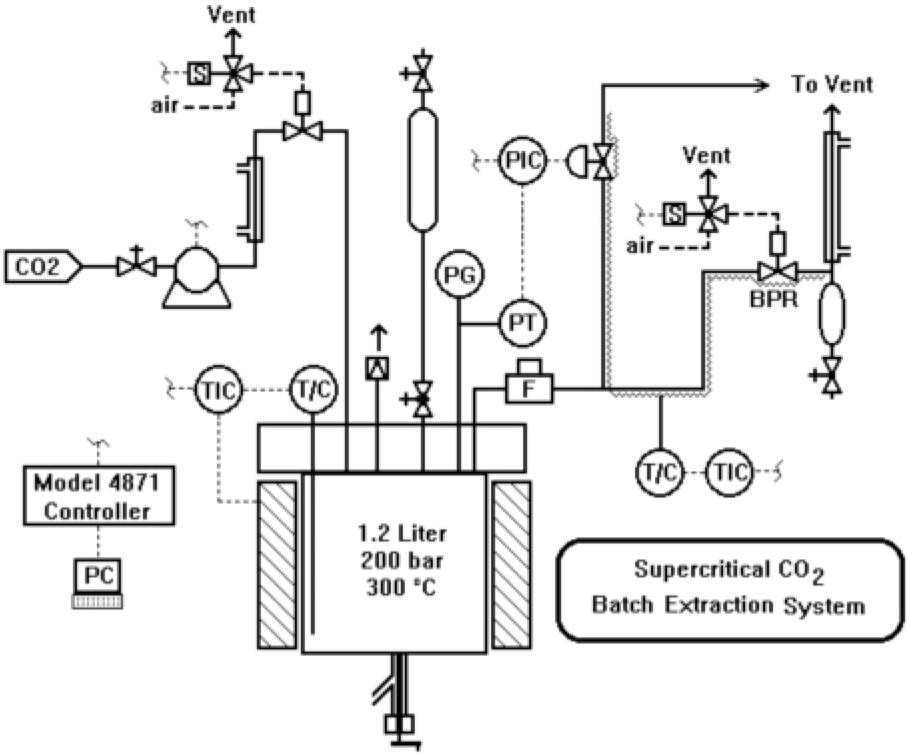
Supercritical Fluids

Supercritical CO2 System shown with optional Aperture Window.

Supercritical CO2

A supercritical fluid is any substance at a temperature and pressure above its critical point. It can diffuse through solids like a gas and dissolve materials like a liquid. Near the critical point, small changes in pressure or temperature result in large changes in density, allowing many properties of a supercritical fluid to be "fine-tuned". Supercritical fluids are suitable as a substitute for organic solvents in a range of industrial and laboratory processes. Carbon dioxide is one of the many commonly used supercritical fluids. Applications that involve supercritical fluids include extractions, nano particle and nano structured film formation, supercritical drying, carbon capture and storage, as well as enhanced oil recovery studies. Parr has provided systems at one time or another for all the aforementioned applications.

The supercritical fluid extraction system pictured to the left and diagramed below incorporates a 1.2 liter vessel rated for use at 4300 psig (300 bar) at temperatures to 300°C. The system includes an automated inlet valve and an air piloted back pressure regulator which is used to facilitate a controlled pressure release at the end of the test. The vessel is heated with a 1500W flexible mantle heater. The feed system (not pictured) includes a pump capable of delivering up to 1.5 gallons per minute (5.7 lpm) of liquid carbon dioxide at pressures up to 4000 psig (275 bar).



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