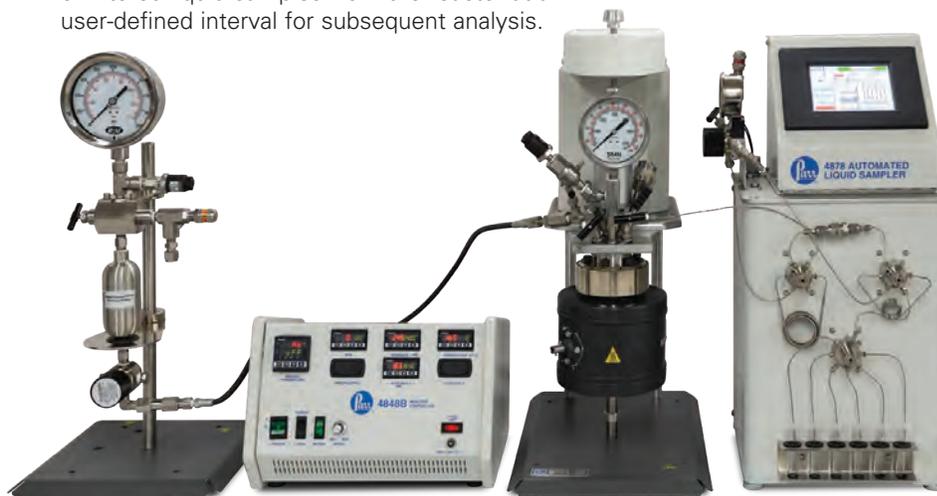


# Catalyst Testing System

## 2280 Burette, 4566 Reactor with 4848 Controller, and 4878 Automated Liquid Sampler

The recent introduction of Parr's 4878 Automated Liquid Sampler has allowed the construction of a complete system for activity/kinetic testing of catalysts in a high pressure, high temperature environment. In the system shown, a Parr 2280 Gas Burette with 50 mL reservoir delivers H<sub>2</sub> at a user-settable, constant pressure to a 4566 300 mL stirred reactor. Operation at up to 180 bar at up to 350 °C is possible. A Parr XCAD (eXternal Catalyst Addition Device) allows introduction of solid/powder catalyst to the liquid contents of the reactor **at reaction pressure and temperature**, setting t=0 for kinetic experiments. An included gas entrainment impeller provides for high speed three phase mixing. A Parr 4878 Automated

Liquid Sampler allows unattended collection of filtered liquid samples from the reactor at a user-defined interval for subsequent analysis.



## Bottom Drain Valves



A465VB Bottom Drain Valve

**Bottom drain valves can be added** to most Parr reactors. These valves are particularly useful for those working with polymers or other material that must be discharged from the reactor while they are still hot and before they can solidify. These valves are also quite useful for the 1 gallon and larger vessels which are too large to conveniently lift from the heater for product recovery. Bottom valves are rarely installed on the micro and mini reactors with their small volumes and light vessel weights.

The standard bottom drain valve has a rising stem, that is flush with the inside cylinder bottom so that there is no dead space between the bottom of the vessel and the shut off point of the valve. In the fully open position the stem is retracted completely to open a clear passage for draining the vessel.

When the valve is reclosed, any material in this passage will be pushed back into the reactor by the rising stem. Valves with 3/8" diameter clear passage are recommended for vessels with volumes from 1000 mL to 2 gallons. A 1/4" valve is available

for 600 mL and smaller vessels. High pressure and larger diameter valves are available where required.

These valves will withstand the full operating pressures and temperatures of the vessels in which they are installed in the closed position. They are available in all of the current Parr materials of construction. Users can also specify that a reactor ordered with a bottom valve shall have a tapered bottom so that it will drain easily through the valve opening.

Not all Parr reactors will accept a bottom drain valve. Since the valve extends approximately 8 inches below the bottom of the vessel, the entire vessel must be raised by this amount to accommodate the valve. This makes some models too tall for convenient bench top operation. The specification tables for each model will identify those reactors in which a bottom drain can be readily installed, and those which will not accept a bottom drain, or those which will require custom modification of the heater and support stand to accommodate a bottom valve.

### Needle Valves and Ball Valves

Needle valves and ball valves can also be installed as bottom outlet valves. Needle valves are generally used on the smaller reactors. While ball valves can be used for large discharge passages, they are generally limited in their operating temperature/pressure capabilities and they leave a fairly large dead space between the bottom of the vessel and the seat of the valve.

### Bottom Drain Valves

Part No.	Opening Dia., in.	Outlet Connection	Max. Press., psi	Max. Temp., °C	Seal
A485VB	0.20	1/4" NPT (F)	3000	225	PTFE
A485VB2	0.20	1/4" NPT (F)	3000	350	Silver
A485VB3	0.20	1/4" NPT (F)	3000	350	Silver
A465VB	0.34	3/8" NPT (F)	2000	350	Grafoil
A465VB2*	0.34	3/8" NPT (F)	2000	350	Grafoil
A465VB3	0.34	3/8" NPT (F)	2000	350	Silver
A177VB2	0.31	3/8" NPT (F)	5000	500	Silver
A296VB2	0.69	1" NPT (F)	1900	350	Silver

\* Set up for a Band Heater.