Type:
General Purpose

Stand:
Bench Top

Mounting Style:
Moveable or
Fixed Head
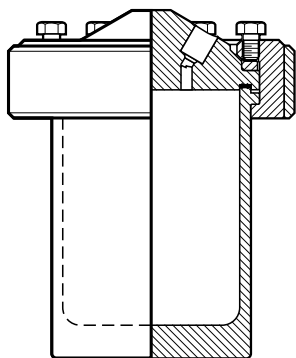
Sizes, mL:
1000 and 2000
970 and 1900 HP

Standard Pressure
MAWP Rating, psi (bar):
1900 (131)

Standard Maximum
Operating Temp., °C:
225 w/ FKM O-ring
300 w/ FFKM O-ring
350 w/ PTFE Flat Gasket

High Pressure (HP)
MAWP Rating, psi (bar):
2900 (200)

Maximum Operating
Temperature, °C at
High Pressure (HP):
350 @ 2900 psi

Series 4600 Pressure Vessel Systems, 1 & 2 Liter

4600-1L Cross Section

The Series 4600, 1.0 and 2.0 L Vessels are the largest of the Parr Vessels that can be handled on a bench top.

These reactors are available with an FKM O-ring seal for operating temperatures to 225 °C, and FFKM O-ring for temperatures to 300 °C, or with a flat, PTFE gasket for operating temperatures up to 350 °C maximum. An optional HP (High Pressure) flat gasket version has been added for maximum allowable working pressure of 2900 psi (200 bar) at 350 °C. Both fixed head and moveable vessel designs are available.

An optional pneumatic lift is available for the heavier 2 liter cylinder and heater. It should be noted, however, that the 2 liter, fixed head model is tall and may not be convenient to operate on a standard height bench top. We recommend using a floor stand.

With their larger diameter, these mid-size reactors have sufficient space for special modifications, such as an internal cooling coil, bottom drain valve (not on 2 liter bench top), ball valve for a solids charging port, catalyst addition devices, condensers, electrical feed-throughs and more.

4600-1L Pressure Vessel with Valve, Gage, Rupture Disc, and Thermowell (VGR) and single inlet valve (-VD)

4600-1L with Rupture Disc Assembly

4600

Series 4600 Pressure Vessel Specifications				
Shaded bar indicates specifications that change within series.				
Model Number	**4600**			
Approximate Volume, mL	1000	2000	970	1900
Maximum Pressure (MAWP)	1900 psi (131 bar)		2900 psi (200 bar)	
Maximum Temperature				
with FKM O-ring	225 °C		N/A	
with FFKM O-ring	300 °C			
with PTFE Flat Gasket	350 °C			
with Flexible Graphite Flat Gasket	350 °C			
Vessel Details				
Mounting Style	Moveable or Fixed Head			
Closure	Split-Ring (6 Compression Bolts for Flat Gasket, No Compression Bolts for O-ring)		Split-Ring with 12 Compression Bolts	
Head Opening Options	One head opening (1/8" NPT, 1/4" NPT, "B" socket, or rupture disc assembly port) Ports for valve, gage, rupture disc, and thermowell with thermocouple (VGR) Custom port option (Contact our technical sales department to discuss options)			
Maximum Head Openings	7 (Dependent on opening size, and required fittings)			
Valve Connections	1/8" Male NPT			
Pressure Gage, Size	4.5" Diameter			
Range	0-2000 psi (138 bar)		0-3000 psi (207 bar)	
Temperature Measurement	Thermowell			
Cooling Coil (Optional)	Serpentine			
Bottom Drain Valve (optional, requires stand)	3/8" NPT		1/4" NP	
Stand and Heater (optional)				
Stand Type*	Bench Top Heater with Base Plate (Also Available: Bench Top Stand, Floor Stand, Floor Stand w/ Pneumatic Lift, Floor Cart)			
Heater Style, Bench Top Heater	Calrod			
Heater Power, Watts (115V / 230V)	1000	1350 / 1500	1000	1350 / 1500
Maximum Load, amps, (115V / 230V)	8 / 4	11 / 6	8 / 4	11 / 6
*Heater watts and amps vary between different stand with heater styles, contact Parr Technical Support for more information.				
Weights & Dimensions				
Cylinder I.D. x Depth, inches	4.0 x 5.4	4.0 x 10.5	3.75 x 5.4	3.75 x 10.5
Vessel Assembly w/Moveable Head Weight, pounds**	22	27	26	34
Vessel Assembly w/Fixed Head Weight, pounds**	25	30	28	35
Cylinder Weight, pounds	8.9	14	11	18

**Vessel Assembly weight varies based on head configuration choice and fitting options.
Weights shown are based on vessels with valve, gage, rupture disc, thermocouple, and double valve assembly.

Other options available. See Ordering Guide, visit www.parrinst.com, or call for more information.

Series 4600 Pressure Vessel Systems

Index to Options

4600-2L-VGR Vessel, Moveable Head

4600-2L-VGR Vessel with bench top heater (-BTH) and base plate

Series 4600 Ordering Guide

An example order number for a vessel in this series is: **4600-1L-T-SS-VGR-2000**

A composite identification number to be used when ordering a 4600 Series Pressure Vessel System can be developed by combining individual symbols from the separate sections below. For more information on how to use this ordering guide, .

A Vessel Rating

- No Symbol	Standard rating, 1900 psi at 350 °C (1 & 2 Liter Vessels)
-HP	High pressure rating, 2900 psi at 350 °C (970 & 1900 mL Vessels)

B Vessel Volume

-1000mL	1000 mL, 4" ID (standard rating only)
-2000mL	2000 mL, 4" ID (standard rating only)
-970mL	970 mL, 3.75" ID (high pressure rating only)
-1900mL	1900 mL, 3.75" ID (high pressure rating only)

C Head Mounting Style

-No Symbol	Moveable Head (Standard configuration)
-FH	Fixed Head

D Gasket / Maximum Temperature

-T	PTFE Flat Gasket, 350 °C
-OV	FKM O-ring, 225 °C
-OK	FFKM O-ring, 300 °C
-FG	Flexible Graphite Flat Gasket, 350 °C

E Vessel Material of Construction

-SS	T316 Stainless Steel
-C20	Alloy 20
-MO	Alloy 400
-IN600	Alloy 600
-IN625	Alloy 625
-HB	Alloy B-2 / B-3
-HC	Alloy C-276
-NI	Nickel 200
-TI2	Titanium Grade 2
-TI4	Titanium Grade 4
-ZR702	Zirconium Grade 702
-ZR705	Zirconium Grade 705

See page 10 or 24 for complete list of available alloys.

F Head Configuration

-RD	Rupture disc port with rupture disc assembly & disc
-1/8	One head opening, 1/8" NPT port, plugged
-1/4	One head opening, 1/4" NPT port, plugged
-B	One head opening, "B" socket
-VGR	Valve on gage adapter, pressure gage, rupture disc assembly, & thermocouple w/thermowell
-NS	Non-standard, custom head opening

G Optional Fittings & Custom Options (List all needed)

-VD	Single valve on head w/ dip tube (VGR Required)
-DVD	Double valve assembly on head w/ dip tube (VGR Required)
-SC	Serpentine cooling coil
-BDV	Bottom drain valve
-4310B	Gage block assembly (for head with "A" socket opening)
-CAD	Internal Catalyst Addition Device
-XCAD	External Catalyst Addition Device
-SCP	Solids Charging Port (Ball Valve)
-RC	Reflux Condenser
-RTC	Reflux/Take-Off Condenser
-WJ	Welded Jacket

H Pressure Gage Option (VGR and Gage Block only)

-No Symbol	None
-3000	3000 psi / 207 bar
-2000	2000 psi / 138 bar
-1000	1000 psi / 69 bar
-600	600 psi / 40 bar
-200	200 psi / 14 bar
-100	100 psi / 7 bar

I Stand and Heater Options

-No Symbol	None
-BTH	Bench top heater with base plate (moveable head only)
-BTS	Bench top stand (moveable or fixed head)
-FC	Floor cart (moveable head only)
-FS	Floor stand (moveable or fixed head)
-FSP	Floor stand with pneumatic lift (fixed head only)

J Controller

-No Symbol	None
-4838	PID Control, Ramp & Soak Programming, and Data logging with Software (RS-485 to USB cable not included). For use with one additional display module.
-4848	PID Control, Ramp & Soak Programming, and Data logging with Software. (RS-485 to USB cable not included). For use with up to three additional display modules.

See Chapter 6 for complete list of Controller options.

K Controller Options

-PDM	Pressure Display Module
-HTM	High Temperature Cut Off Module
-ETLM	External Temperature Limit Module
-SVM	Solenoid Valve Module (for cooling control)
-A1925E4	RS-485 to USB Converter (required for data logging)
-A1925E6	RS-485 to USB Converter, isolated
-A3504HC	SpecView Software Package

L Electrical Supply for Heater and/or Controller

-No Symbol	None
-115	115V Heater
-230	230V Heater

M Certifications

-ASME	ASME Documentation
-CE	CE Documentation
-P	Parr Certification