



**Parr Instrument Company**

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## **Chapter 8 Start**

This pdf is just one chapter from our Catalog 4500. Please refer to all eight chapters to make the proper equipment choice for your needs.

# **Stirred Reactors and Pressure Vessels**



**Designing and Building Quality Pressure Apparatus for 120 Years**

# Non-Stirred Reactor Systems **Chapter 8**



## **Inside This Chapter You Will Find:**

[4700 22 & 45 mL](#)

[4740 25 & 75 mL High Pressure](#)

[4750 125 & 200 mL](#)

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# Non-Stirred Pressure Vessels



Parr offers a broad selection of non-stirred pressure vessels in convenient styles, sizes and pressure ranges for many laboratory uses. Recent additions to this line have included new sizes, new temperature and pressure combinations and new self-sealing closures, all designed to provide convenient vessels for laboratory procedures that must be performed under pressure at elevated temperatures.



## Pressure Vessel Selection Procedure

The steps to be followed in selecting a non-stirred pressure vessel are similar to those used for a stirred reactor. Selection begins with the Guide to Non-Stirred Vessels, from which the user can identify the Model Number for vessels in a range of sizes with temperature and pressure ratings suitable

for the intended application. Detailed specifications and catalog numbers can then be found on the referenced page. After the specifications have been established, the options and accessories required to customize a complete pressure vessel system can be selected.

### Guide to Parr Non-Stirred Vessels

Series Number	Vessel Size	Max. Pressure psi (bar)	Maximum Temperature °C	See Page Number
4700	22 & 45 mL	1700 (115)	300	142
4740	25 & 75 mL	8500 (586)	538	144
4750	125 & 200 mL	3000 (207)*	350	146
4790	25-100 mL	3000 (207)*	350	148
4790HP	25-100 mL	5000 (345)	350	148
4790HP/HT	25-100 mL	5000 (345)	500	148
4760	100-600 mL	3000 (207)*	350	152
4760HT	300-600 mL	2000 (138)	500	152
4600	1000-2000 mL	1900 (131)	350	156
4600HP	970-1900 mL	2900 (200)	350	156
4625	600-1200 mL	5000 (345)	350	160
4650	250-1000 mL	6000 (413)	600	162
4660	1 & 2 gallon	1900 (131)	350	164
4680	1000 & 1800 mL	6000 (413)	600	166
4670	1 & 1.5 gallon	3000 (207)*	500	168
4675	2.6 & 5 gallon	1900 (131)	350	170

\* 200 bar for CE Orders

**Custom options available.** Contact Parr's Customer Service Department.



Model 4600-2L, with 1/4-in plug

## Head Design

Many of the non-stirred vessels offer a basic head with an NPT plug. These should be considered as only a starting point for custom built vessels as they *do not* include a safety relief device. Safety codes, good practice, and common sense dictate that a safety relief device should be installed on all vessels. The NPT plug is provided for the user to install their own safety relief device.

***Users who take delivery of vessels without safety relief devices installed must take responsibility for installing adequate protective devices before the vessel is placed in service.***





Parr Non-Stirred Vessels with Volumes from 22 to 2000 mL.



Available Accessories Include Heaters, Controllers, Valves, Gage Block Assemblies, and Gas Filling Hoses

### Index to Non-Stirred Vessel Design Features, Options and Accessories

#### Primary Accessories

Primary Accessories	Reference Page
Heaters	116
Controllers	99
Gage Block Assemblies	173
Valves and Fittings	132

#### Options

Options	Reference Page
Gaskets and Seals	18
Materials of Construction	10
Pressure	125
Gages	124
Rupture Disc	8
Certification	

#### Accessories\*

Accessories*	Reference Page
Liners	129
Pressure Hoses	133
Check Valves	132
Liquid Pipettes	127
Gas Filling	126

\*May require modifications of vessel to install

Series Number:

# 4700

Type:  
**General Purpose**

Mounting Style:  
**Moveable**

Vessel Sizes, mL:  
**22 & 45**

Standard Pressure  
MAWP Rating, psi (bar):  
**1700 (115)**

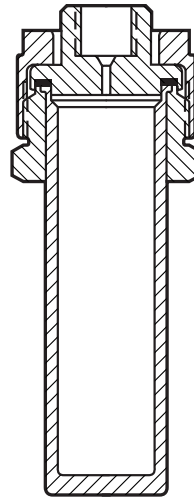
Maximum Operating  
Temp., °C:  
**300**

## Series 4700 Pressure Vessels, 22 & 45 mL

**These are the smallest of the Parr General Purpose Pressure Vessels.** They have a 1-inch inside diameter and are offered in two different lengths with volumes of 22 and 45 mL.

These vessels have a flat PTFE or flexible graphite gasket that is sealed with a screw cap. Special wrenches and bench sockets are offered for tightening these closures. The screw caps and bodies are made of alloy steel for use at temperatures to 300 °C. The maximum working pressure is 1700 psi (115 bar). The standard material of construction for these small, inexpensive vessels is Type 316 Stainless Steel, but they are also available in all of the current materials of construction Parr provides.

There is room for a single opening on the head of these vessels. This is generally an "A" socket which will accept a 4310 Gage Block Assembly.



4700-45mL-A Cross Section

These heads can also be furnished with 1/8" NPT, 1/4" NPT, or a rupture disc assembly.

These vessels are normally heated in ovens, baths, or similar general purpose heating devices. Special heaters for these vessels are not available from Parr.



Model 4700-22mL-A Vessel shown with needle valve.

### Series 4700 Pressure Vessel Specifications

Shaded bar indicates specifications that change within series.

Model Number	4700	
Approximate Volume, mL	22	45
Maximum Pressure (MAWP)	1700 psi (115 bar)	
Maximum Temperature	300 °C	
Vessel Details		
Mounting Style	Moveable Only	
Closure	Screw Cap - Steel	
Head Seal	Flat Gasket	
Head Opening Options	One head opening (1/8" NPT, 1/4" NPT, "A" socket, or rupture disc assembly port) Custom port option (Contact our technical sales department to discuss options)	
Maximum Head Openings	1	
Temperature Measurement	N/A	
Stand and Heater Type	N/A	
Weight and Dimensions		
Cylinder I.D. x Depth, inches	1.0 x 1.6	1.0 x 3.8
Vessel Assembly Weight, pounds*	0.8	1.10
Cylinder Weight, pounds	0.2	0.5

\*Vessel weight is based on a moveable head vessel with a plugged "A" socket. Vessel weight will vary based on head configuration choice and fitting options.

Other options available. See Ordering Guide, visit [www.parrinst.com](http://www.parrinst.com), or call for more information.

## Series 4700 Ordering Guide



Model 4700-45mL-A Vessel, with 4310 Gage Block Assembly.

An example order number for a vessel this series is:

**4700-45mL-T-SS-A-21AC4-A22AC3**

A composite identification number to be used when ordering a 4700 Series Pressure Vessel can be developed by combining individual symbols from the separate sections below. For more information on how to use this ordering guide, please see page 27.

### A Vessel Volume

-22mL	22 mL, 1" ID
-45mL	45 mL, 1" ID

### B Gasket / Maximum Temperature

-T	PTFE Gasket, 300 °C
-FG	Flexible Graphite Flat Gasket, 300 °C

### C Materials 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.

### D 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
-A	One head opening, "A" socket
-NS	Non-standard, custom head opening

### E Optional Fittings & Custom Options (Check all needed)

-V	Needle Valve
-4310A	Gage Block Assembly (for head with "A" socket opening)

### F Required Accessories

Part No.	Description
-21AC4	Wrench
-A22AC3	Bench Socket

### G Certifications

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

Please note that all options and combinations are not compatible with all models.

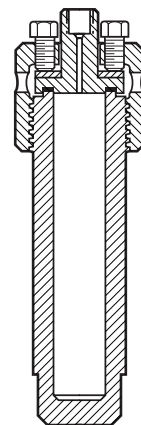
Series Number:

**4740**Type:  
**High Pressure /  
High Temperature**Vessel Mounting:  
**Moveable**Vessel Sizes, mL:  
**25 & 75**Maximum Pressure  
MAWP Rating, psi (bar):  
**8500 (586)**Maximum Operating  
Temp., °C:  
**538**

## Series 4740 HP/HT Pressure Vessels, 25 & 75 mL

**These high pressure/high temperature pressure vessels have a 1-inch.** They have a 1-inch inside diameter and offer volumes of 25 or 75 mL. These vessels are closed with an alloy steel screw cap which includes six compression bolts to develop the sealing force on a flat, flexible graphite gasket. Interchangeable PTFE gaskets are also available for users who need the high pressure capabilities provided by these vessels, but who do not need to operate above 350 °C. Maximum pressure drops quickly at temperatures above 350 °C to a rating of 1850 psi (125 bar) at 538 °C. These vessels are available in all of the standard materials currently offered by Parr, although some of these materials will limit the maximum pressures and temperatures available.

The head of these vessels can only accommodate one opening. It is designed to accept the 4310A Gage Block Assembly which can be furnished with or without a thermocouple. Parr offers the 4921 Bench Top Ceramic Fiber heater for use with the 75 mL, 4740 Vessel only. The smaller 25 mL Vessels are generally heated in an oven, bath, furnace or similar general purpose heater (not available from Parr)

**4740-75 mL Cross Section**

### Series 4740 Pressure Vessel Specifications

Shaded bar indicates specifications that change within series.

Approximate Volume, mL	25	75
Maximum Pressure		
Head & Cylinder of T316SS With Standard Screw Cap	8500 psi (586 bar) @ 350 °C 4100 psi (282 bar) @ 500 °C 1850 psi (127 bar) @ 538 °C	
Head & Cylinder of T316SS With Alloy C-276 Screw Cap	8500 psi (586 bar) @ 350 °C 8000 psi (551 bar) @ 500 °C 7900 psi (544 bar) @ 538 °C	
Maximum Temperature		
With PTFE Flat Gasket	350 °C	
With Flexible Graphite Flat Gasket	500-538 °C	
Vessel Details		
Mounting Style	Moveable	
Closure	Screw Cap (6 Compression Bolts)	
Head Seal	Flat Gasket	
Head Opening Options	One head opening (“A” socket, or rupture disc assembly port) Custom port option (Contact our technical sales department to discuss options)	
Maximum Head Opening	1	
Temperature Measurement (Optional)	Thermocouple (in cylinder bottom or in optional gage block assembly)	
Stand and Heater (optional)		
Stand type	N/A	Bench Top Stand with Heater
Heater Style		Ceramic Fiber
Heater Power, Watts		700
Maximum Load, amps, 115V / 230V		6 / 3
Weight and Dimensions		
Cylinder I.D. x Depth, inches	1.0 x 1.7	1.0 x 5.6
Vessel Assembly Weight, pounds*	4	6
Cylinder Weight, pounds	1.4	3.2
*Vessel weight is based on a moveable head vessel with a plugged “A” socket. Vessel weight will vary based on head configuration choice and fitting options.		
Other options available. See Ordering Guide, visit <a href="http://www.parrinst.com">www.parrinst.com</a> , or call for more information.		

# Series 4740 Ordering Guide

An example order number for a vessel in this series is:

## 4740-75mL-FG-SS-A

A composite identification number to be used when ordering a 4740 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, [please see page 27](#).



Model 4740-75mL-A  
Vessel, with  
4310 Gage Block  
Assembly.



Model 4740-75mL Vessel, with  
bench top stand and Ceramic  
Fiber Heater (-BTS).

### A Vessel Volume

-25mL	25 mL, 1" ID
-75mL	75 mL, 1" ID

### B Gasket / Maximum Temperature

-T	PTFE Gasket, 350 °C
-FG	Flexible Graphite Flat Gasket, 500-538 °C

### C Materials of Construction

-SS	T316 Stainless Steel
-C20	Alloy 20
-M0	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*

\* Maximum temperature and/or pressure limited  
See page 10 or 24 for complete list of available alloys.

### D Head Configuration

-RD	Rupture disc port with rupture disc assembly & disc
-A	One head opening, "A" socket
-NS	Non-standard, custom head opening

### E Optional Fittings & Custom Options (Check all needed)

-HCSC	Alloy C-276 Screw Cap for HPHT
-TC	Thermocouple (in cylinder bottom)
-4310A	Gage block assembly (for head with "A" socket opening)
-4310ATC	Gage block assembly with thermocouple (for head with "A" socket opening)

### F Pressure Gage Option

-No Symbol	None
-10,000	10,000 psi / 690 bar
-7500	7500 psi / 517 bar
-5000	5000 psi / 345 bar
-3000	3000 psi / 207 bar
-2000	2000 psi / 138 bar

Please note that all options and combinations are not  
compatible with all models.

### G Stand with Heater Options

-No Symbol	None
-BTS	Ceramic Fiber Heater w/Stand, 700W

### H 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 addi- tional 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.

### I Controller Options (Check all needed)

-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 Cable for 4838/4848 Controller (required for data logging)
-A1925E6	RS-485 to USB Converter, isolated, 30-ft
-A2208E	RS-485 Daisy Chain for Multiple Controllers (Must be used with A1925E6)
-A3504HC	SpecView Software Package for 4838/4848 Controller

### J Electrical Supply for Heater and/or Controller

-No Symbol	None
-115	115V Power
-230	230V Power

### K Certifications

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

Please note that all options and combinations are not  
compatible with all models.

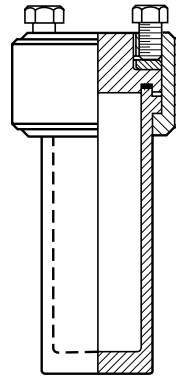


Series Number:

**4750**Type:  
**General Purpose**Mounting Style:  
**Moveable**Vessel Sizes, mL:  
**125 & 200**Standard Pressure  
MAWP Rating, psi (bar):  
**3000 (200)**Maximum Operating  
Temp., °C:  
**350**

## Series 4750 General Purpose Pressure Vessels, 125 & 200 mL

**General Purpose 4750 Series Vessels** are available in volumes of 125 and 200 mL, with temperatures up to 350 °C and maximum pressure of 3000 psi (200 bar). They come standard with a Split Ring closure with 6 compression bolts, and a choice of three different head styles: 1/8" NPT w/plug, an "A" Socket, or an "A" Socket with Thermocouple. The maximum amount of openings for this head style is two and would be dependent on the size of the ports and the type of fittings required. For the 4750 Series General Purpose Vessels, Parr offers the 4921 Ceramic Fiber Heater.

**4750 Cross Section****Model 4750-200mL-A  
Vessel, with 4310 Gage  
Block Assembly.**

### Series 4750 Pressure Vessel Specifications

Shaded bar indicates specifications that change within series.

Model Number	4750	
Approximate Volume, mL	125	200
Maximum Pressure (MAWP)	3000 psi (207 bar, 200 bar for CE orders)	
Maximum Temperature	350 °C	
Vessel Style		
Head Style	Moveable	
Closure	Split-Ring (6 Compression Bolts)	
Head Seal	Flat Gasket - PTFE	
Head Opening Options	One head opening (1/8" NPT, 1/4" NPT, "A" socket, or rupture disc assembly port) Two head openings ("A" socket and 1/8" NPT or two 1/8" NPT) Custom port option (Contact our technical sales department to discuss options)	
Maximum Head Openings	2	
Temperature Measurement (optional)	Fixed Thermocouple (Thermowell for special alloys)	
Stand and Heater (optional)		
Stand Type	Bench Top Stand with Heater	
Heater Style	Ceramic Fiber	
Head Style	700	
Head Style	6 / 3	
Weight and Dimensions		
Cylinder I.D. x Depth, inches	1.5 x 4.4	1.5 x 6.9
Vessel Assembly Weight, pounds*	4.4	5
Cylinder Weight, pounds	1.7	2.4

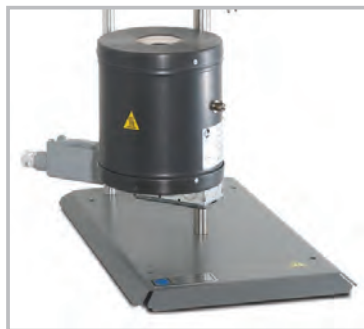
\*Vessel weight is based on a moveable head vessel with a "A" socket and 1/8" NPT port.  
Vessel weight will vary based on head configuration choice and fitting options.

Other options available. See Ordering Guide, visit [www.parrinst.com](http://www.parrinst.com), or call for more information.

# Series 4750 Ordering Guide



Model 4750-125mL-A Vessel, with 4310 Gage Block Assembly.



Available stand assembly with heater

An example order number for a vessel in this series is:

**4750-125mL-T-SS-A-21AC4-A22AC3**

A composite identification number to be used when ordering a 4750 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, please see page 27.

## A Vessel Volume

-125mL	125 mL, 1" ID
-200mL	200 mL, 1" ID

## B Gasket / Maximum Temperature

-T	PTFE Gasket, 350 °C
-FG	Flexible Graphite Flat Gasket, 500-538 °C

## C Materials 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.

## D 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
-A	One head opening, "A" socket
-A & 1/8	Two head openings, "A" socket & 1/8" NPT w/ thermocouple
-(2)1/8	Two head openings, (2) 1/8" NPTF(s) w/ plug and w/ thermocouple
-NS	Non-standard, custom head opening

## E Optional Fittings & Custom Options (Check all needed)

-4310A	Gage block assembly (for head with "A" socket opening)
-TC	Thermocouple (requires 1/8" NPT opening)

## F Pressure Gage Option (Gage Block Assembly Required)

-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

## G Stand with Heater Options

-No Symbol	None
-BTS	Bench Top Stand w/ Heater

## H 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.

## I Controller Options (Check all needed)

-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 Cable for 4838/4848 Controller (required for data logging)
-A1925E6	RS-485 to USB Converter, isolated, 30-ft
-A2208E	RS-485 Daisy Chain for Multiple Controllers (Must be used with A1925E6)
-A3504HC	SpecView Software Package for 4838/4848 Controller

## J Electrical Supply for Heater and/or Controller

-No Symbol	None
-115	115V Power
-230	230V Power

## K Certifications

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

Please note that all options and combinations are not compatible with all models.

Series Number:

# 4790

Type:  
**Micro**

Stand:  
**Bench Top**

Mounting Style:  
**Moveable or  
Fixed Head**

Sizes, mL:  
**25, 50, 100**

Standard Pressure  
MAWP Rating, psi (bar):  
**3000 (200)**

High Pressure (HP)  
MAWP Rating, psi (bar):  
**5000 (345)**

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

High Temperature (HT) /  
High Pressure (HP)  
Maximum Operating  
Temperature, °C:  
**500 w/ FG Flat Gasket**  
(Fixed Head Only)

## Series 4790 Pressure Vessels, 25-100 mL

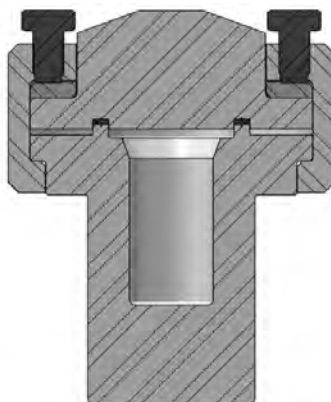
**These small pressure vessels** are a good choice for chemists working with very expensive materials or materials only available in small amounts. They will also appeal to users who wish to minimize the risks associated with hazardous materials or reactions by restricting the reactants or products to a minimum. Use of the Series 4790 Vessels also helps minimize the quantities of waste products which may require special disposal procedures. The 4790 Vessels are now available in high pressure (5000 psi) or high pressure/high temperature (500 °C) versions.

These micro vessels have been designed to provide as many of the features of the larger vessels as possible in the limited space available. The standard head fittings include a gage, rupture disc, thermocouple, and valves. Optional cooling is available with aluminum block heaters with cooling capability, welded jackets, or cold fingers.

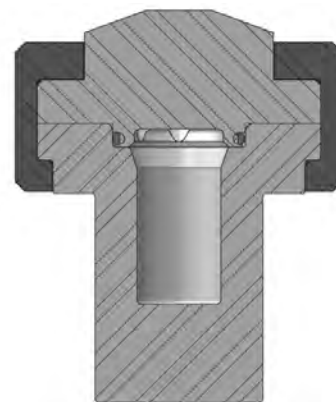
The vessels are offered in both fixed head and moveable head vessel styles with choices of a self sealing O-ring for temperatures up to 225 °C or with FFKM O-ring for temperatures to 300 °C or with a flat PTFE flat gasket for temperatures to 350 °C, or with an FG Flexible Graphite gasket for temperatures to 500 °C with the HP/HT option (for fixed head versions only). A split ring closure is standard.

All three volumes use the same bench top ceramic fiber heater.

These micro vessels can be easily converted from one size to another by simply substituting a larger or smaller cylinder and the corresponding internal fittings. The support system can also be readily adapted to accept any of the vessels from the 4790 Series Vessels. The opportunity to modify these small reactors is restricted because of the limited head space available.



4790-25mL Cross Section  
with Flat Gasket Seal



4790-25mL Cross Section  
with O-ring Seal



4790-100mL-VGR-DVD Moveable Head Vessel with PTFE Flat Gasket

4790

Series 4790 Pressure Vessel Specifications			
Shaded bar indicates specifications that change within series.			
Model Number	4790		
Approximate Volume, mL	25	50	100
Maximum Pressure (MAWP)			
Standard Rating	3000 psi (207 bar, 200 bar for CE orders)		
High Pressure (HP)	5000 psi (345 bar)		
High Pressure/High Temperature (HP/HT)	5000 psi (345 bar)		
Maximum Temperature			
with FKM O-ring	225 °C		
with FFKM O-ring	300 °C		
with PTFE Flat Gasket	350 °C		
with Flexible Graphite Flat Gasket (HP/HT only)	500 °C		
Vessel Details			
Mounting Style	Moveable or Fixed Head (HP/HT option requires Fixed Head)		
Closure	Split-Ring (6 Compression Bolts for Flat Gasket, no Compression Bolts for O-ring) or Screw Cap (O-ring seal only)		
Head Opening Options	One head opening (1/8" NPT*, 1/4" NPT*, "A" socket, or rupture disc assembly port) Ports for valve, gage, rupture disc, and thermocouple (VGR**) Custom port option (Contact our technical sales department to discuss options)		
Maximum Head Openings	5 (Dependent on opening size, and required fittings)		
Valve Connections	1/8" NPT Male (standard rating), 1/4" NPT Male (HP), 1/4" NPT Female (HP/HT)		
Pressure Gage, Size	3.5 inches		
Range, Standard Temperature	0-3000 psi (207 bar)		
Range, HP & HP/HT	0-5000 psi (345 bar)		
Temperature Measurement	Fixed Thermocouple (Thermowell for special alloys)		
Cooling (optional)	Cold Finger		
* NPT ports are not available for vessels with a High Temperature (HT) rating. ** 4790HPHT requires VGR.			
Stand and Heater (optional)			
Stand Type	Heater Only (standard rated and HP vessels only) and Bench Top Stand with Heater (required for HT vessels)		
Heater Style (Standard rating & HP)	Ceramic Fiber Heater		
Heater Power, Watts	700	700	350
Maximum Load, amps, 115V / 230V	6 / 3	6 / 3	3 / 2
Heater Style (HP/HT)	Ceramic Fiber Heater		
Heater Power, Watts	700		
Maximum Load, amps, 115V / 230V	6 / 3		
Weight and Dimensions			
Cylinder I.D. x Depth, inches	1.0 x 2.0	1.3 x 2.3	1.3 x 4.6
Vessel Assembly w/ Moveable Head, Weight, pounds**	16	15	16
Vessel Assembly w/ Fixed Head, Weight, pounds**	17	17	18
Cylinder Weight, pounds	3.5	3.1	4.2
** 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 <a href="http://www.parrinst.com">www.parrinst.com</a> , or call for more information.			



# Series 4790 Pressure Vessel Systems

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Model 4790-25mL Vessel  
w/ Double Valve Assembly



4790-100mL-HP/HT Fixed Head Vessel

# Series 4790 Ordering Guide

An example order number for a vessel in this series is: **4790-25mL-T-SS-3000**

A composite identification number to be used when ordering a 4790 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, please see page 27.

## A Vessel Volume

-No Symbol	3000 psi / 207 bar, 200 bar for CE orders @ 350 °C
-HP	5000 psi / 345 bar @ 350 °C
-HPHT	5000 psi / 345 bar @ 350 °C

## B Vessel Volume

-25mL	25 mL, 1" ID
-50mL	50 mL, 1.3" ID
-100mL	100 mL, 1.3" ID

## C Head Mounting Style

-No Symbol	Moveable Head (Standard configuration)
-FH	Fixed Head (Required for HP/HT rating)

## 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, 500 °C (HPHT option only)

## E Materials of Construction

-SS	T316 Stainless Steel
-C20	Alloy 20*
-M0	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*

\* High temperature option not available.

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
-A	One head opening, "A" socket
-VGR	Valve on gage adapter, pressure gage, rupture disc assembly, & thermocouple (includes thermowell for special alloys)
-NS	Non-standard, custom head opening

## G Optional Fittings & Custom Options (Check all needed)

-VD	Single Valve on head with dip tube (VGR Required)
-DVD	Double Valve Assembly on head with dip tube (VGR Required)
-CF	Cold Finger
-4310A	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

-No Symbol	Single Valve on head with dip tube (VGR Required)
-5000	5000 psi / 345 bar
-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
-NS	Heater only, no stand (Temperatures up to 350 °C)
-BTS	Bench Top Stand with Heater

See Section "G" for Welded Jacket option

## J Controller

-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 (Check all needed)

-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 Cable for 4838/4848 Controller (required for data logging)
-A1925E6	RS-485 to USB Converter, isolated, 30-ft
-A2208E	RS-485 Daisy Chain for Multiple Controllers (Must be used with A1925E6)
-A3504HC	SpecView Software Package for 4838/4848 Controller

## L Electrical Supply for Heater and/or Controller

-No Symbol	None
-115	115V Power
-230	230V Power

## M Certifications

-No Symbol	No Certification
-ASME	ASME Documentation
-CE	CE Documentation
-P	Parr Certification

Please note that all options and combinations are not compatible with all models.

Series Number:

# 4760

Type:

**Mini**

Stand:

**Bench Top**

Mounting Style:

**Moveable or  
Fixed Head**

Sizes, mL:

**100-600**

Standard Pressure

MAWP Rating, psi (bar):

**3000 (200)**

High Pressure (HP)

MAWP Rating, psi (bar):

**2000 (138)**

Standard Maximum  
Operating Temp., °C:

**225 w/ FKM O-ring**

**300 w/ FFKM O-ring**

**350 w/ PTFE Flat Gasket**

High Temperature (HT) /  
Maximum Operating  
Temperature, °C:

**500 w/ FG Flat Gasket**

## Series 4760 Pressure Vessels, 100-600 mL

**These are the most popular of our small general purpose vessels.** Parr offers a range of sizes large enough to work with significant sample sizes, yet small enough to be handled with ease by all operators.

They are made in both fixed head and moveable vessel styles and 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.

Choosing the high temperature option (HT) boosts the maximum temperature to 500 °C, but reduces the MAWP to 2000 psi (138 bar). Standard temperature vessels can be converted to high temperature vessels (500 °C max temperature and 2000 psi MAWP) by changing the head assembly (contains cone connections, high temperature valves, and Grafoil® gasket) replacing the heater with a ceramic fiber heater and replacing the split ring. Contact Parr for details.

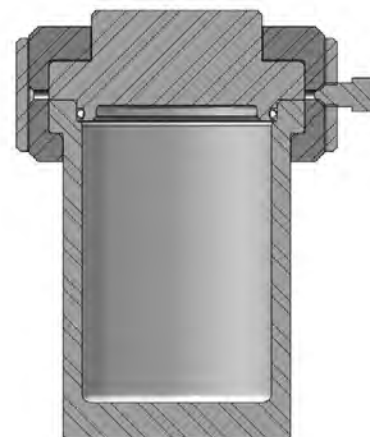
Although internal and external space is limited on these small vessels, custom ports and fittings are available. All vessels in this series can also be easily

converted from one size to another by simply substituting a longer or shorter cylinder with the corresponding internal fittings and heater.

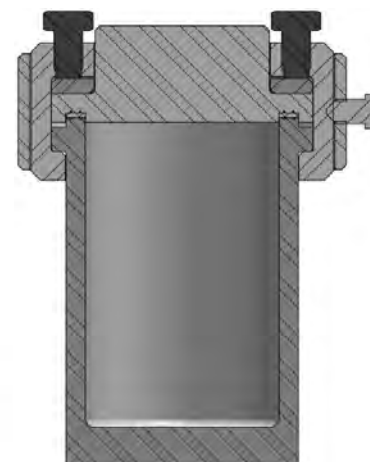
Clamp-on or mantle heaters are available for the Series 4760 moveable vessels. Stands with heaters are offered for the fixed head vessels.

The heaters furnished for non-stirred vessels are the same as those furnished for the stirred versions of the same size vessels. A full description of the different types of heaters is found in our Heater Options section. Automatic temperature controllers are available for most Parr non-stirred vessels.

Custom heaters are also available for these vessels when it is necessary to meet explosion proof requirements, to accommodate installed windows or fittings, or to convert to a welded jacket for steam or oil heating.



**4760Q Cross Section  
with O-ring Seal**



**4760 Cross Section  
with Flat Gasket Seal**

**4760-160mL-VGR-DVD Vessel, BTS Support Stand w/ Heater,  
and 4838 Controller.**



**4760-300mL with plug and rupture disc  
assembly installed.**

4760

Series 4760 Pressure Vessel Specifications					
Shaded bar indicates specifications that change within series.					
Model Number	4760				
Approximate Volume, mL	100	160	300	450	600
Maximum Pressure (MAWP)	3000 psi (207 bar, 200 bar for CE orders)				
Maximum Pressure for HT (MAWP)	N/A		2000 psi (138 bar)		
Maximum Temperature					
with FKM O-ring	225 °C				
with FFKM O-ring	300 °C				
with PTFE Flat Gasket	350 °C				
with Grafoil Gasket (HT)	N/A		500 °C		
Vessel Details					
Mounting Style	Moveable or Fixed Head				
Closure	Split-Ring (6 Compression Bolts for Flat Gasket, no Compression Bolts for O-ring)				
Head Opening Mounts	One head opening (1/8" NPT*, 1/4" NPT* "A" socket, or rupture disc assembly port) Ports for valve, gage, rupture disc, and 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" NPT Male, 1/8" NPT Female for HT				
Pressure Gage, Size	3.5 inches				
Range, Standard Temperature	0-3000 psi (207 bar)				
Range, High Temperature	N/A		0 - 2000 psi (138 bar)		
Temperature Measurement	Fixed Thermocouple (Thermowell for special alloys)				
Cooling Coil (optional)	N/A		Single Loop		
Bottom Drain Valve (BDV) (optional)	1/4" NPT (Not available on HT Models)				
* NPT ports are not available for vessels with a High Temperature (HT) rating.					
Stand and Heater (optional)					
Cooling Coil (optional)	Heater Only (standard rated vessels only) and Bench Top Stand with Heater (standard rated vessels and high temperature rated vessels)				
Heater Style (Standard Temperature)	Clamp-on Band		Rigid Mantle		
Heater Power, Watts	525		510	590	780
Maximum Load, amps (115V / 230V), Nominal	5 / 3		5 / 3	5 / 3	7 / 4
Heater Style (High Temperature)	N/A		Ceramic Fiber		
Heater Power, Watts			800	800	1100
Maximum Load, amps (115V / 230V), Nominal			7 / 4	7 / 4	10 / 5
Weight & Dimensions					
Cylinder I.D. x Depth, inches	2.0 x 2.0	2.5 x 2.0	2.5 x 4.0	2.5 x 6.0	2.5 x 8.0
Vessel Assembly w/ Moveable Head Weight, pounds**	14	13	14	15	17
Vessel Assembly w/ Moveable Head Weight, pounds**	15	14	15	17	18
Cylinder Weight, pounds	3.3	2.4	3.7	4.9	6.2
** 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 <a href="http://www.parrinst.com">www.parrinst.com</a> , or call for more information.					



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## Series 4760 Pressure Vessel Systems



Model 4760-300mL, VGR-VD with PTFE Flat Gasket and optional second valve.



Model 4760-300mL-A Vessel with Adapter and Needle Valve.

Model 4760-600mL, with VGR, O-ring seal, and single inlet valve.



4760-300mL, Fixed Head, Quick-release Split Ring, and a 4838 Temperature Controller.

# Series 4760 Ordering Guide

An example order number for a vessel in this series is: **4760-100mL-T-SS-VGR-3000**

A composite identification number to be used when ordering a 4760 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, please see page 27.

## A Vessel Rating

-No Symbol	3000 psi, 200 bar @ 350 °C
-HT	2000 psi, 138 bar @ 500 °C (300, 450, or 600 mL only)

High Pressure sizes are 970 mL & 1900 mL

## B Vessel Volume

-100mL	100 mL, 2.0" ID
-160 mL	160 mL, 2.5" ID
-300 mL	300 mL, 2.5" ID
-450 mL	450 mL, 2.5" ID
-600 mL	600 mL, 2.5" ID

## 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, 500 °C (HT option only)

## E Vessel Material of Construction

-SS	T316 Stainless Steel
-C20	Alloy 20*
-M0	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*

\*High temperature option not available.

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
-A	One head opening, "A" socket
-VGR	Valve on gage adapter, pressure gage, rupture disc assembly, & thermocouple (includes thermowell for special alloys)
-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)
-CL	Cooling Loop
-BDV	Bottom drain valve
-4310A	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
-NS	Heater only, no stand (Temperatures up to 350 °C)
-BTS	Bench top stand with heater

See Section "G" for Welded Jacket option

## J Controller

-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 Cable for 4838/4848 Controller (required for data logging)
-A1925E6	RS-485 to USB Converter, isolated, 30-ft
-A2208E	RS-485 Daisy Chain for Multiple Controllers (Must be used with A1925E6)
-A3504HC	SpecView Software Package for 4838/4848 Controller

## L Electrical Supply for Heater and/or Controller

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

## M Certifications

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

Series Number:

# 4600

Type:  
**General Purpose**

Stand:  
**Bench Top**

Mounting Style:  
**Moveable or  
Fixed Head**

Sizes, mL:  
**1000 and 2000  
970 and 1900 HP**

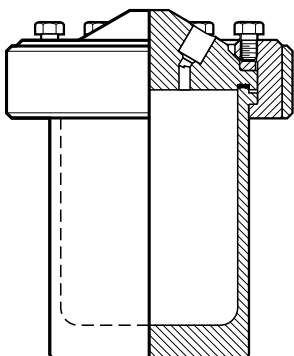
Standard Pressure  
MAWP Rating, psi (bar):  
**1900 (131)**

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 <a href="http://www.parrinst.com">www.parrinst.com</a> , or call for more information.				



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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, [please see page 27](#).

<b>A Vessel Rating</b>	
-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>B Vessel Volume</b>	
-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)

<b>C Head Mounting Style</b>	
-No Symbol	Moveable Head (Standard configuration)
-FH	Fixed Head

<b>D Gasket / Maximum Temperature</b>	
-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

<b>E Vessel Material of Construction</b>	
-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.

<b>F Head Configuration</b>	
-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

<b>G Optional Fittings &amp; Custom Options (List all needed)</b>	
-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

<b>H Pressure Gage Option (VGR and Gage Block only)</b>	
-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

<b>I Stand and Heater Options</b>	
-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)

<b>J Controller</b>	
-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.

<b>K Controller Options</b>	
-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

<b>L Electrical Supply for Heater and/or Controller</b>	
-No Symbol	None
-115	115V Heater
-230	230V Heater

<b>M Certifications</b>	
-ASME	ASME Documentation
-CE	CE Documentation
-P	Parr Certification

Series Number:

# 4625

Type:  
**High Pressure**

Stand:  
**Floor Stand or Bench Top**

Mounting Style:  
**Moveable or Fixed Head**

Vessel Sizes, mL:  
**600 and 1200**

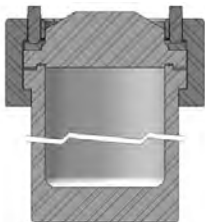
High Pressure  
MAWP Rating, psi (bar):  
**5000 (345)**

Standard Maximum  
Operating Temperature, °C:  
**350 w/ PTFE Flat Gasket**



**Model 4625-1200mL-VGR-DVD Vessel**

## Series 4625 High Pressure Vessel Systems, 600 & 1200 mL



**4625 Cross Section**

**This series of vessels has been designed** for users who need higher operating pressures than the 2000 to 3000 psi offered by the General Purpose Reactors, but do not require the high operating temperatures provided by the

Series 4650 High Pressure, High Temperature Reactors. These reactors offer working pressures to 5000 psi (345 bar) at temperatures to 350 °C.

These vessels have been designed with outside dimensions comparable to the Series 4600 so that they can use the same support system and heater as these popular general purpose models.

This provides not only an attractively priced high pressure/moderate temperature system, but also reactors that can be interchanged with the 1 and 2 liter sizes. The thicker walls required for higher operating pressures reduce the volumes of these reactors to 600 and 1200 mL.

These vessels can be used in either the bench top, floor stand, or moveable cart mountings. While the 1200 mL reactor is offered as a fixed head bench top model, it is too tall and too heavy to be handled comfortably on a standard height bench top. It is recommended that a floor stand support option should be selected unless the user has an adjustable bench top which will accommodate the overall height of the 1200 mL systems.

### Series 4625 Pressure Vessel Specifications

Shaded bar indicates specifications that change within series.

Model Number	4625	
Approximate Volume, mL	600	1200
Maximum Pressure (MAWP)	5000 psi (345 bar)	
Maximum Temperature		
with PTFE Flat Gasket	350 °C	
with Flexible Graphite Flat Gasket	350 °C	
Vessel Details		
Mounting Style	Moveable or Fixed Head	
Closure	Split-Ring with 8 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	1/4" Male NPT	
Pressure Gage, Size	4.5" Diameter	
Range	0-5000 psi (345 bar)	
Temperature Measurement	Thermowell	
Cooling Coil (optional)	Serpentine or Loop	
Bottom Drain Valve (BDV) (optional)	1" NPS (Floor Stand or Moveable Cart Only)	
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	1000	1350 / 1500
Maximum Load, amps, 115V / 230V	8 / 4	11 / 6
*Heater watts and amps vary between different stand with heater styles, contact Parr Technical Support for more information.		
Weight & Dimensions		
Cylinder I.D. x Depth, inches	3.25 x 4.7	3.25 x 9.8
Vessel Assembly w/ Moveable Head, Weight, pounds**	47	58
Vessel Assembly w/ Fixed Head, Weight, pounds**	50	62
Cylinder Weight, pounds	18	29
**Vessel weight is based on a vessel with VGR head fittings. Vessel weight will vary based on head configuration choice and fitting options.		
Other options available. See Ordering Guide, visit <a href="http://www.parrinst.com">www.parrinst.com</a> , or call for more information.		

# Series 4625 Ordering Guide

An example order number for a vessel in this series is: **4625-600mL-T-SS-1/8-21AC4-A22AC3**

A composite identification number to be used when ordering a 4625 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, [please see page 27](#).

A Vessel Volume	
-600mL	600 mL, 3.25" ID
-1200mL	1200 mL, 3.25"
B Head Mounting Style	
-No Symbol	Moveable Head (Standard configuration)
-FH	Fixed Head
C Gasket / Maximum Temperature	
-T	PTFE Flat Gasket, 350 °C
-FG	Flexible Graphite Flat Gasket, 350 °C
D Material of Construction	
-SS	T316 Stainless Steel
-C20	Alloy 20
-M0	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.	
E 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 and thermowell
-NS	Non-standard, custom head opening
F 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
G Pressure Gage Option (VGR required)	
-No Symbol	None
-10000	10000 psi / 690 bar
-7500	7500 psi / 517 bar
-5000	5000 psi / 345 bar
-3000	3000 psi / 207 bar

H 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)
I 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.	
J Controller Options	
-PDM	Pressure Display Module
-HTM	High Temperature Cut Off Module
-ETLM	External Temperature Limit Module
-A1925E4	RS-485 to USB Converter (required for data logging)
-A1925E4	RS-485 to USB Converter, isolated
-A3504HC	SpecView Software Package
K Electrical Supply for Heater and/or Controller	
-No Symbol	None
-115	115V Heater
-230	230V Heater
L Certifications	
-ASME	ASME Documentation
-CE	CE Documentation
-P	Parr Certification

**Model 4625-1200mL Vessel w/ Bench Top Heater (BTH)**





Series Number:

**4650**

Type:  
**High Pressure  
High Temperature**

Stand:  
**Bench Top**

Mounting Style:  
**Moveable or  
Fixed Head**

Vessel Sizes, mL:  
**250-1000**

High Pressure  
MAWP Rating, psi (bar):  
**4200 (290)**

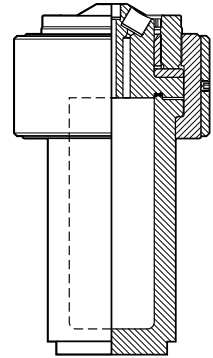
Standard Maximum  
Operating Temperature, °C:  
**500 w/ Grafoil Gasket**

High Temperature  
Maximum Operating  
Temperature, °C:  
**600 w/ Grafoil Gasket**

# Series 4650 High Pressure / High Temperature Vessel Systems

**4650 Series High Pressure and High Temperature Vessels** are available in volumes of 250, 500, and 1000 mL. These vessels can obtain temperatures up to 600 °C and a maximum pressure of 6000 psi (410 bar). The maximum pressure at maximum temperature is 4200 psi (290 bar) at 600 °C. They come standard with a Split Ring Closure with 8 Compression bolts, and a VGR head design that includes Valve, Gage, Rupture Disc, and Thermowell. An additional valve with dip tube can be added.

The maximum allowable head openings are seven but this may be limited by the types of fittings required. These vessels are available as either a moveable or fixed head design.



4650-1000mL Cross Section

Series 4650 Pressure Vessel Specifications			
Shaded bar indicates specifications that change within series.			
Model Number	4650		
Approximate Volume, mL	250	500	1000
Maximum Pressure (MAWP)	5000 psi (345 bar) @ 500 °C 6000 psi (413 bar) @ 350 °C 4200 psi (289 bar) @ 600 °C		
Maximum Temperature			
with PTFE Flat Gasket	350 °C		
with Flexible Graphite Flat Gasket	500-600 °C		
Vessel Details			
Mounting Style	Moveable or Fixed Head		
Closure	Split-Ring (8 Compression Bolts)		
Head Opening Options	Ports for valve, gage, rupture disc, and 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	1/4" NPT Female		
Pressure Gage, Size	4.5 inches		
Range	0-5000 psi (345 psi) or 0-7500 psi (517 bar)		
Temperature Measurement	Thermowell		
Cooling Coil (optional)	Single Loop		
Stand and Heater (optional)			
Stand Type	Bench Top Heater with base plate (moveable head only) and Bench Top Stand with Heater (fixed head)		
Heater Style	Ceramic Fiber Heater		
Heater Power, Watts	1500		
Maximum Load, amps, 115V / 230V	15 / 9		
Weights & Dimensions			
Cylinder I.D. x Depth, inches	2.5 x 3.25	2.5 x 6.63	2.5 x 13.13
Vessel Assembly w/ Moveable Head Weight, pounds**	38	45	57
Vessel Assembly w/ Fixed Head Weight, pounds**	33	40	52
Cylinder Weight, pounds	8.9	15	26
** 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 <a href="http://www.parrinst.com">www.parrinst.com</a> , or call for more information.			

# Series 4650 Ordering Guide

An example order number for a vessel in this series is: **4650-250mL-FG-SS-VGR-VD-5000**

A composite identification number to be used when ordering a 4650 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, please see page 27.

## A Vessel Volume

-250mL	250 mL, 2.5" ID
-500mL	500 mL, 2.5" ID
-1000mL	1000 mL, 2.5" ID

## B Head Mounting Style

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

## C Gasket / Maximum Temperature

-T	PTFE Flat Gasket, 350 °C
-FG	Flexible Graphite Flat Gasket, 350 °C

## D Material of Construction

-SS	T316 Stainless Steel
-C20	Alloy 20*
-M0	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*

\*High temperature option not available.

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

## E Head Configuration

-VGR	Valve on gage adapter, pressure gage, rupture disc assembly, & thermocouple and thermowell
-NS	Non-standard, custom head opening

## F 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)
-CL	Cooling Loop
-BDV	Bottom Drain Valve
-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

## G Pressure Gage

-No Symbol	None
-10000	10000 psi / 690 bar
-7500	7500 psi / 517 bar
-5000	5000 psi / 345 bar
-3000	3000 psi / 207 bar
-2000	2000 psi / 138 bar

## H Stand and Heater Options

-No Symbol	None
-BTH	Bench Top heater with base plate
-BTS	Bench Top Stand with Heater

## I 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.

## J Controller Options (Check all needed)

-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, 30-ft
-A2208E	RS-485 Daisy Chain for Multiple Controllers (Must be used with A1925E6)
-A3504HC	SpecView Software Package

## K Electrical Supply for Heater and/or Controller

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

## L Certifications

-No Symbol	No Certification
-ASME	ASME Documentation
-CE	CE Documentation
-P	Parr Certification



Model 4650-250mL Vessel with VGR, Thermocouple, and Single Inlet Valve (-VD)

Model 4650-500mL Removeable Head Vessel with Bench Top Heater and Base Plate

Series Number:

# 4660

Type:  
**General Purpose**

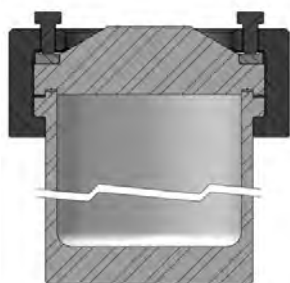
Stand:  
**Floor Stand**

Mounting Style:  
**Moveable or Fixed Head**

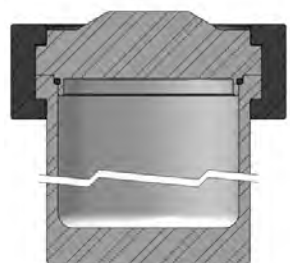
Vessel Sizes, Gallons (Liters)  
**1 (3.75) and 2 (7.99)**

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**



**4660 Cross Section  
with Flat Gasket Seal**



**4660Q Cross Section  
with O-ring Seal**

## Series 4660 Pressure Vessel Systems, 1 & 2 Gallon

**The 4660 Vessels extend the range of Parr Pressure Vessels to 1 and 2 gallon (3.75 and 7.99 liter) sizes.**

These vessels 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.

Both fixed head and moveable head designs are available. The moveable head vessels are designed so that they can be opened or closed conveniently without removing the cylinder from the heater and without auxiliary handling equipment. The split-ring cover clamp sections can be moved into place from the sides, and the compression bolts can be tightened with the vessel in place in its heater. The fixed head versions allow the head (and the connections made to it) to remain in place while the cylinder and heater are lowered with the aid of the included pneumatic lift system.

An optional bottom drain valve may be added for convenient product recovery. As with the smaller floor stand models, these larger, self-contained systems can be equipped with a variety of attachments, such as condensers, solids charging ports, bottom drains, special heaters, jacketed vessels and automatic valves and regulators. Because of the higher wattage heaters for these reactors, all models in this series require a 230 volt power supply.

Series 4660 Pressure Vessel Specifications		
Shaded bar indicates specifications that change within series.		
Model Number	4660	
Approximate Volume, Gallon (Liter)	1 (3.75)	2 (7.99)
Maximum Pressure (MAWP)	1900 psi (131 bar)	
Maximum Temperature		
with FKM O-Ring	225 °C	
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 with 10 Compression Bolts, no Compression Bolts for O-ring)	
Head Opening Options	One head opening (1/4" NPT 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	10 (Dependent on opening size, and required fittings)	
Valve Connections	1/4" NPT Female	
Pressure Gage, Size	4.5 inches	
Range	0-2000 psi (138 bar)	
Temperature Measurement	Thermowell	
Cooling Coil (optional)	Serpentine	
Bottom Drain Valve	3/8" NPT	
Stand and Heater (optional)		
Stand Type	Floor Cart with heater (moveable head only) Floor Stand with Pneumatic Lift and heater (fixed head)	
Heater Style	Calrod	
Heater Power, Watts	2250	2750
Maximum Load, amps, 230V	10	12
Weights & Dimensions		
Cylinder I.D. x Depth, inches	6.0 x 8.5	6.0 x 17.1
Vessel Assembly w/ Moveable Head Weight, pounds*	84	103
Vessel Assembly w/ Fixed Head Weight, pounds*	98	117
Cylinder Weight, pounds	33	52
* 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 <a href="http://www.parrinst.com">www.parrinst.com</a> , or call for more information.		

# Series 4660 Ordering Guide

An example order number for a vessel in this series is: **4660-1G-T-SS-VGR-2000**

A composite identification number to be used when ordering a 4660 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, please see page 27.

<b>A Vessel Volume</b>	
-1G	1 Gallon, 6" ID
-2G	2 Gallon, 6" ID

<b>B Head Mounting Style</b>	
-No Symbol	Moveable Head (Standard configuration)
-FH	Fixed Head

<b>C Gasket / Maximum Temperature</b>	
-T	PTFE Flat Gasket, 350 °C
-FG	Flexible Graphite Flat Gasket, 350 °C

<b>D Material of Construction</b>	
-SS	T316 Stainless Steel
-C20	Alloy 20
-M0	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.

<b>E Head Configuration</b>	
-1/4	One head opening, 1/4" NPT port, plugged
-RD	Rupture disc port with rupture disc assembly & disc
-VGR	Valve on gage adapter, pressure gage, rupture disc assembly, & thermocouple and thermowell
-NS	Non-standard, custom head opening

<b>F Optional Fittings &amp; Custom Options (List all needed)</b>	
-VD	Single Valve on head w/ dip tube (VGR Required)
-DVD	Double Valve Assembly on head w/ dip tube (VGR Required)
-CL	Cooling Loop
-BDV	Bottom Drain Valve
-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

<b>G Pressure Gage</b>	
-No Symbol	None
-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

<b>H Stand and Heater Options</b>	
-No Symbol	None
-FC	Floor Cart with Heater
-FSP	Floor Stand with Pneumatic Lift and heater

<b>I Controller</b>	
-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.

<b>J Controller Options (Check all needed)</b>	
-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, 30-ft
-A2208E	RS-485 Daisy Chain for Multiple Controllers (Must be used with A1925E6)
-A3504HC	SpecView Software Package

<b>K Electrical Supply for Heater and/or Controller</b>	
-No Symbol	None
-230	230V Heater

<b>L Certifications</b>	
-No Symbol	No Certification
-ASME	ASME Documentation
-CE	CE Documentation
-P	Parr Certification



Model 4660-1G Vessel in Floor Cart with Heater and 4848 Controller

Model 4660-2G Vessel, Fixed Head Floor Stand, with Pneumatic Lift and Heater



Series Number:

**4680**

Type:  
**High Pressure  
High Temperature**

Stand:  
**Cart or Floor Stand**

Mounting Style:  
**Moveable or  
Fixed Head**

Vessel Sizes, Liters:  
**1 and 1.8**

High Pressure  
MAWP Rating, psi (bar):  
**6000 (410)**

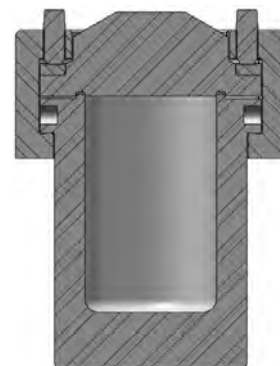
Standard Maximum  
Operating Temperature, °C:  
**600 w/ Flat FG Gasket**



**4680-1800mL Fixed Head  
Vessel shown with Split  
Rings open and vessel down  
using a pneumatic lift.**

## Series 4680 High Pressure / High Temperature Vessel Systems, 1 & 1.8 Liters

The **Series 4680 High Pressure/High Temperature Vessels** are available with either a 1.0 L or 1.8 L capacity. These vessels can obtain temperatures up to 600 °C and a maximum pressure of 6000 psi (410 bar). The maximum pressure at maximum temperature is 4200 psi (290 bar) at 600 °C. A Split Ring closure with 12 Compression Bolts secures the head which allows a maximum of 8 openings. The Series 4680 Vessels can be configured with either a fixed head on a floor stand or as a moveable head vessel on a moveable cart. The fixed head versions allow the head (and the connections made to it) to remain in place while the cylinder and heater are lowered with the aid of the included pneumatic lift system.



**4680 Cross Section**

### Series 4680 Pressure Vessel Specifications

Shaded bar indicates specifications that change within series.

Model Number	4680	
Approximate Volume, mL	1000	1800
Maximum Pressure (MAWP)	5000 psi (345 bar) @ 500 °C 6000 psi (413 bar) @ 350 °C 4200 psi (289 bar) @ 600 °C	
Maximum Temperature		
with PTFE Flat Gasket	350 °C	
with Flexible Graphite Flat Gasket	500-600 °C	
Vessel Details		
Mounting Style	Moveable or Fixed Head	
Closure	Split-Ring with 12 Compression Bolts	
Head Opening Options	One head opening ("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	8 (Dependent on opening size, and required fittings)	
Valve Connections	1/4" NPT Female	
Pressure Gage, Size	4.5 inches	
Range	0-5000 psi (345 bar) or 0-7500 psi ( 517 bar)	
Temperature Measurement	Thermowell	
Cooling Coil (optional)	Single Loop	
Bottom Drain Valve	1" NPS	
Stand and Heater (optional)		
Stand Type	Floor Cart with heater (moveable head only) Floor Stand with Pneumatic Lift and heater (fixed head)	
Heater Style	Ceramic Fiber	
Heater Power, Watts	2300	2500
Maximum Load, amps, 230V	10	11
Weights & Dimensions		
Cylinder I.D. x Depth, inches	3.75 x 6.12	3.75 x 10.5
Vessel Assembly w/ Moveable Head Weight, pounds*	74	94
Vessel Assembly w/ Fixed Head Weight, pounds*	88	104
Cylinder Weight, pounds	36	52

\*Vessel weight is based on a vessel with VGR head fittings.  
Vessel weight will vary based on head configuration choice and fitting options.

Other options available. See Ordering Guide, visit [www.parrinst.com](http://www.parrinst.com), or call for more information.

# Series 4680 Ordering Guide

An example order number for a vessel in this series is: **4680-1000mL-FG-SS-VGR-5000**

A composite identification number to be used when ordering a 4680 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, please see page 27.

<b>A Vessel Volume</b>	
-1000mL	1000 mL, 3.75" ID
-1800mL	1800 mL, 3.75" ID

<b>B Head Mounting Style</b>	
-No Symbol	Moveable Head (Standard configuration)
-FH	Fixed Head

<b>C Gasket / Maximum Temperature</b>	
-T	PTFE Flat Gasket, 350 °C
-FG	Flexible Graphite Flat Gasket, 350 °C

<b>D Material of Construction</b>	
-SS	T316 Stainless Steel
-C20	Alloy 20
-M0	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.

<b>E Head Configuration</b>	
-B	One head opening, "B" socket
-RD	Rupture disc port with rupture disc assembly & disc
-VGR	Valve on gage adapter, pressure gage, rupture disc assembly, & thermocouple and thermowell
-NS	Non-standard, custom head opening

<b>F Optional Fittings &amp; Custom Options (List all needed)</b>	
-VD	Single Valve on head w/ dip tube (VGR Required)
-DVD	Double Valve Assembly on head w/ dip tube (VGR Required)
-CL	Cooling Loop
-BDV	Bottom Drain Valve
-4310B	Gage Block Assembly (for head with "B" 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

<b>G Pressure Gage</b>	
-No Symbol	None
-10000	10000 psi / 690 bar
-7500	7500 psi / 517 bar
-5000	5000 psi / 345 bar
-3000	3000 psi / 207 bar
-2000	2000 psi / 138 bar

<b>H Stand and Heater Options</b>	
-No Symbol	None
-FC	Floor Cart with heater (moveable head only)
-FSP	Floor Stand w/ Pneumatic Lift and heater (fixed head)

<b>I Controller</b>	
-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.

<b>J Controller Options (Check all needed)</b>	
-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, 30-ft
-A2208E	RS-485 Daisy Chain for Multiple Controllers (Must be used with A1925E6)
-A3504HC	SpecView Software Package for 4838/4848 Controller

<b>K Electrical Supply for Heater and/or Controller</b>	
-No Symbol	None
-230	230V Heater

<b>L Certifications</b>	
-No Symbol	No Certification
-ASME	ASME Documentation
-CE	CE Documentation
-P	Parr Certification



4680-1800mL Fixed Head Vessel, double valve w/ dip tube, gas release valve, gage, rupture disc, and thermowell

4680-1800mL Moveable Head High Pressure Vessel in Floor Cart with Heater

Series Number:

**4670**

Type:  
**High Pressure  
High Temperature**

Stand:  
**Cart or Floor Stand**

Mounting Style:  
**Moveable or  
Fixed Head**

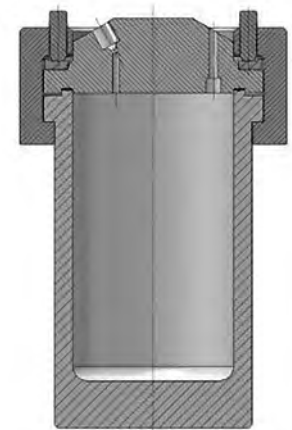
Vessel Sizes, Gallons (Liters):  
**1 (3.75) and 1.5 (5.8)**

Standard Pressure  
MAWP Rating, psi (bar):  
**3000 (200)**

Standard Maximum  
Operating Temperature, °C:  
**600 w/ Flat FG Gasket**

## Series 4670 HP-HT Vessel Systems, 1 and 1.5 Gallon

**The Series 4670 High Pressure/High Temperature Vessels are available in either a 1.0 or 1.5 Gallon capacity.** These vessels can obtain temperatures up to 600 °C and a maximum pressure of 3000 psi (207 bar). The maximum pressure at maximum temperature is 2200 psi (151 bar) at 600 °C. A Split Ring closure with 16 Compression Bolts secures the head which allows a maximum of 12 openings. The Series 4670 Vessels can be configured with either a fixed head on a floor stand or as a moveable head vessel on a moveable cart. The fixed head versions allow the head (and the connections made to it) to remain in place while the cylinder and heater are lowered with the aid of the included pneumatic lift system.



**4670 Cross Section**

Series 4670 Pressure Vessel Specifications		
Shaded bar indicates specifications that change within series.		
Model Number	4670	
Approximate Volume, Gallon (Liter)	1 (3.75)	1.5 (5.8)
Maximum Pressure (MAWP)	3000 psi (207 bar, 200 bar for CE orders) @ 500 °C 2200 psi (151 bar) @ 600 °C	
Maximum Temperature		
with PTFE Flat Gasket	350 °C	
with Flexible Graphite Flat Gasket	500-600 °C	
Vessel Details		
Mounting Style	Moveable or Fixed Head	
Closure	Split-Ring with 16 Compression Bolts	
Head Opening Options	One head opening ( 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	12 (Dependent on opening size, and required fittings)	
Valve Connections	1/4" NPT Female	
Pressure Gage, Size	4.5 inches	
Range	0-3000 psi (207 bar)	
Temperature Measurement	Thermowell	
Cooling Coil (optional)	Serpentine	
Bottom Drain Valve (BDV) (optional)	1" NPS (Floor Stand or Moveable Cart Only)	
Stand and Heater (optional)		
Stand Type*	Floor Cart with heater (moveable head only) Floor Stand with Pneumatic Lift and heater (fixed head)	
Heater Style	Ceramic Fiber	
Heater Power, Watts	2800	
Maximum Load, amps, 230V	12	
*Heater watts and amps vary between different heater styles, contact Parr Technical Support for more information.		
Weights & Dimensions		
Cylinder I.D. x Depth, inches	5.5 x 9.75	5.5 x 15.0
Vessel Assembly w/ Moveable Head Weight, pounds*	113	131
Vessel Assembly w/ Fixed Head Weight, pounds*	124	143
Cylinder Weight, pounds	3653	72
*Vessel weight is based on a vessel with VGR head fittings. Vessel weight will vary based on head configuration choice and fitting options.		
Other options available. See Ordering Guide, visit <a href="http://www.parrinst.com">www.parrinst.com</a> , or call for more information.		

# Series 4670 Ordering Guide

An example order number for a vessel in this series is: **4670-1G-FG-SS-VGR-5000**

A composite identification number to be used when ordering a 4670 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, please see page 27.

A Vessel Volume	
-1G	1 Gallon, 5.5" ID
-1.5G	1.5 Gallon, 5.5" ID

B Head Mounting Style	
-No Symbol	Moveable Head (Standard configuration)
-FH	Fixed Head

C Gasket / Maximum Temperature	
-T	PTFE Flat Gasket, 350 °C
-FG	Flexible Graphite Flat Gasket, 500 or 600 °C

D Material of Construction	
-SS	T316 Stainless Steel
-C20	Alloy 20*
-M0	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*

\*High temperature option not available.

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

E Head Configuration	
-RD	Rupture disc port with rupture disc assembly & disc
-VGR	Valve on gage adapter, pressure gage, rupture disc assembly, & thermocouple and thermowell
-NS	Non-standard, custom head opening

F 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 (1" NPS)
-CAD	Internal Catalyst Addition Device
-XCAD	External Catalyst Addition Device
-SCP	Solids Charging Port (Ball Valve)
-RC	Reflux Condenser
-RTC	Reflux/Take-Off Condenser

G Pressure Gage	
-No Symbol	None
-5000	5000 psi / 345 bar
-3000	3000 psi / 207 bar
-2000	2000 psi / 138 bar

H Stand and Heater Options	
-No Symbol	None
-FC	Floor Cart with heater (moveable head only)
-FSP	Floor Stand w/ Pneumatic Lift and heater (fixed head)

I Controller	
-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.

J Controller Options (Check all needed)	
-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, 30-ft
-A2208E	RS-485 Daisy Chain for Multiple Controllers (Must be used with A1925E6)
-A3504HC	SpecView Software Package for 4838/4848 Controller

K Electrical Supply for Heater and/or Controller	
-No Symbol	None
-230	230V

L Certifications	
-No Symbol	No Certification
-ASME	ASME Documentation
-CE	CE Documentation
-P	Parr Certification



Model 4670-1.5G Moveable Head Vessel on a Floor Cart with Heater and 4848 Controller



Series Number:

# 4675

Type:  
**General Purpose**

Stand:  
**Floor Stand**

Mounting Style:  
**Moveable or  
Fixed Head**

Vessel Sizes, Gallons (Liters):  
**2.6 (10) and 5 (18.75)**

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

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

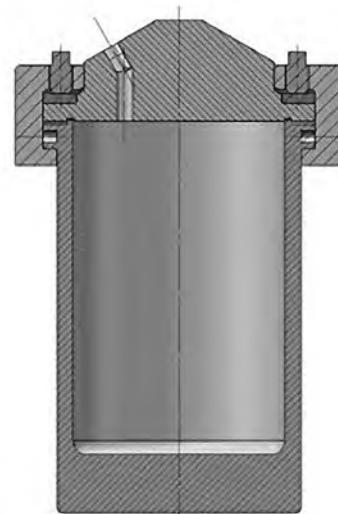
## Series 4675 General Purpose Vessel Systems, 2.6 & 5 Gallon

**The Series 4675 General Purpose Vessels are the largest vessels offered by Parr Instrument Company.** Vessel styles are offered in a moveable head or fixed head design. These vessels 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.

In the moveable head design, the vessel is held in a support system which minimizes the physical effort required to handle these heavy components. The hoist is attached to a support column which provides a convenient means for lifting the head and cylinder out of the stand. Vessels equipped with a bottom drain valve will probably remain in the heater most of the time, but can be lifted out when necessary.

The fixed head support stand features hinged split-rings that swing to either side allowing the head to remain fixed to the stand while a pneumatic lift allows the cylinder to be raised and lowered. When lowered, the cylinder can be slid forward for cleaning and servicing.

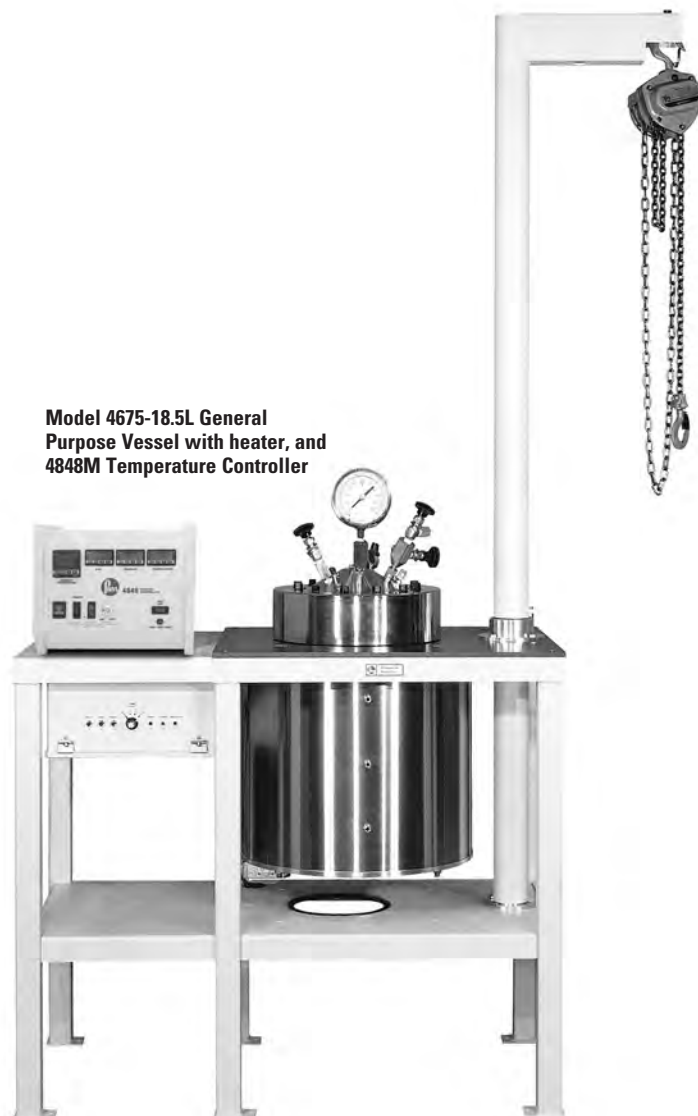
These vessels are generally used for pilot plant or for custom chemical production purposes, usually with a variety of attachments added to the basic units.



4675 Cross Section



Model 4675-10L General Purpose Vessel



Model 4675-18.5L General Purpose Vessel with heater, and 4848M Temperature Controller

4675

Series 4675 Pressure Vessel Specifications		
Shaded bar indicates specifications that change within series.		
Model Number	4675	
Approximate Volume, Gallon (Liter)	5 (18.75)	2.6 (10)
Maximum Pressure (MAWP)	1900 psi (131 bar)	
Maximum Temperature		
with FKM O-Ring	225 °C	
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 with 12 Compression Bolts	Split-Ring with 12 Compression Bolts
Head Opening Options	One head opening (1/4" NPT, 3/8" NPT, 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	12 (Dependent on opening size, and required fittings)	
Valve Connections	1/4" NPT Female	
Pressure Gage, Size	4.5 inches	
Range	0-2000 psi (138 bar)	
Temperature Measurement	Thermowell	
Cooling Coil (optional)	Serpentine	
Bottom Drain Valve (BDV) (optional)	1" NPT	
Stand and Heater (optional)		
Stand Type	Table Floor Stand with manual hoist (moveable head) Floor Stand with Pneumatic Lift (fixed head)	
Heater Options	Band Heater, 3-zone Ceramic, 3-zone (moveable head) Flexible Mantle Heater (low temperatures <200 °C)	Band Heater, 3-zone Flexible Mantle Heater (low temperatures <200 °C)
Heater Power Requirements	Typical power requirements for Parr's large, electrically heated pressure vessels are 40 Amp single phase or 3-Phase power sources. Users are advised to have a qualified electrician determine and install an appropriate mains power supply for the large pressure vessel system. Large pressure vessel systems with lower electrical power requirements, such as low temperature applications are available for use with typical 20 amp 230 volt sources. Contact Parr Technical Sales staff for assistance with electrical specifications.	
Weights & Dimensions		
Cylinder I.D. x Depth, inches	9.5 x 16.25	7.75 x 12.2
Moveable Vessel Assembly Weight, pounds*	335	194
Fixed Vessel Assembly Weight, pounds*	336	195
Cylinder Weight, pounds	157	97
*Vessel weight is based on a vessel with VGR head fittings. Vessel weight will vary based on head configuration choice and fitting options.		
Other options available. See Ordering Guide, visit <a href="http://www.parrinst.com">www.parrinst.com</a> , or call for more information.		

# Series 4675 Ordering Guide

An example order number for a vessel in this series is: **4675-5G-FG-SS-VGR-5000**

A composite identification number to be used when ordering a 4675 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, please see page 27.

## A Vessel Volume

-2.6G	2.6 Gallon, 7.75" ID
-5G	5 Gallon, 9.5" ID

## B Head Mounting Style

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

## C 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

## D 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.

## E Head Configuration

-1/4	One head opening, 1/4" NPT port, plugged
-3/8	One head opening, 3/8" NPT port, plugged
-RD	Rupture disc port with rupture disc assembly & disc
-VGR	Valve on gage adapter, pressure gage, rupture disc assembly, & thermocouple and thermowell
-NS	Non-standard, custom head opening

## F 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 (1" NPS)
-CAD	Internal Catalyst Addition Device
-XCAD	External Catalyst Addition Device
-SCP	Solids Charging Port (Ball Valve)
-RC	Reflux Condenser
-RTC	Reflux/Take-Off Condenser

## G Pressure Gage (VGR Required)

-No Symbol	None
-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

## H Stand Type

-No Symbol	None
-FS	Floor Stand, Table Support with Manual Lift (Moveable Head)
-FSEH	Floor Stand, Table Support with Electric Hoist (115 VAC) (Moveable Head)
-FSP	Floor Stand with Pneumatic Lift (Fixed Head)

## I Heater Options (require stand)

-No Symbol	None
-C3	Ceramic, 3-zone (moveable head, 5 Gallon only)
-B3	Band Heaters, 3-zone
-WJ	Welded Jacket
-FM	Flexible Mantle Heater, 1-zone (200 °C Max. Temp.)

## 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. (Available only for 10 L/18.75 L with Flexible Mantle Heater or 10L with Band Heaters)
-4848M	With Slave Box, 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. (Recommended for 10 L with Band Heaters. Required for 18.75 L with Ceramic or Band Heaters)

See Chapter 6 for complete list of Controller options.

## K Controller Options (Check all needed)

-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, 30-ft
-A2208E	RS-485 Daisy Chain for Multiple Controllers (Must be used with A1925E6)
-A3504HC	SpecView Software Package for 4838/4848 Controller

## L Electrical Supply for Heater and/or Controller

-No Symbol	None
-230	230 VAC, Single Phase (Typically 40A supply required)
-400	400-415V 3-Phase "Y"

## M Certifications

-No Symbol	No Certification
-ASME	ASME Documentation
-CE	CE Documentation
-P	Parr Certification

## Gage Block Assemblies

**Parr gage block assemblies combine the functions** of an Inlet / Outlet Valve, a Pressure Gage, and a Safety Rupture Disc into a compact assembly which can be attached to the head of any small vessel with limited head space using a connecting tube. There is a threaded socket in the block for a gas connection with a pressure hose or tubing using a type "A" coned pressure fitting. Coned fittings are also used on the thick-walled tube which connects the block to the pressure vessel. The valve in this assembly controls the gas flow into the vessel and the gage shows the pressure in the vessel when the valve is closed. A rupture disc with a burst rating matched to the gage is installed in the block.

For small vessels with a 1-inch I.D. that can only accommodate a single head port, we offer a version of the 4310A with a 1/16" O.D. thermocouple.

### Two Sizes

These gage block assemblies are made in two styles which differ only in the size of the pressure gage and the size of the tube connection to the pressure vessel. The smaller 4310A Gage Block Assembly is usually furnished with a 3-1/2 inch diameter pressure gage and includes a 3-inch long connecting tube with type "A" coned fitting. This assembly is normally installed on pressure vessels up to 600 mL.

The 4310B Gage Block Assembly has a 4-1/2 inch diameter gage and type "B" coned fitting on a 3-inch long connecting tube. This assembly is normally installed on vessels of 1000 mL and larger.

The gage block, connecting tube and pressure gage on all of these assemblies are normally made of type 316 Stainless Steel, but they can also be made of Alloy 400 on special order. Longer tubes can be furnished on special order.

### Ordering Information

Part Number	Description
-4310A	with Type "A" Connector
-4310B	with Type "B" Connector

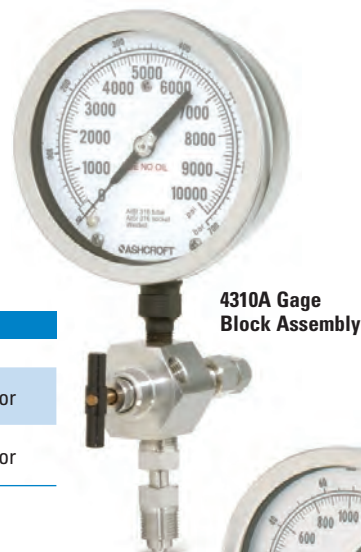
### Available Gages

Any of the gages shown in this table can be installed on these gage block assemblies.

### Gages for Parr Pressure Vessels

Pressure Range		4-1/2" Diameter	3-1/2" Diameter
psi	bar	Gage Number	Gage Number
0-100	0-7	56HCPA	593HCP1AD
0-200	0-14	56HCPB	593HCP2AD
0-600	0-40	56HCPC	593HCP6AD
0-1000	0-69	56HCPD	593HCPD
0-2000	0-138	56HCPF	593HCPF
0-3000	0-207	56HCPG	593HCPG
0-5000	0-345	56HCPH	593HCP50AD
0-7500	0-517	56HCP75A	N/A
0-10000	0-690	56HCPK	N/A

When ordering, specify the catalog number, pressure gage diameter, range, and if a thermocouple is required.



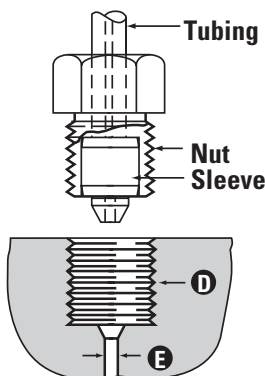
4310A Gage Block Assembly



4310B Gage Block Assembly

## Coned Pressure Fittings

**Gage Blocks, pressure hoses and other parts that are frequently removed from a pressure vessel are attached with a coned, socket type connector.** The male segment of a coned fitting consists of a sleeve with a left-hand thread screwed onto a thick-walled tube, plus a compression nut to complete the assembly. When screwed into a mating socket these parts produce a rigid joint which will remain tight over a wide temperature and pressure range, yet the joint can be made and broken repeatedly without destroying the sealing faces. No gasket or sealing tape is required. These fittings have the added advantage of behaving like union fitting,



allowing the gage block, connecting tube or hose to remain stationary while the nut is tightened.

Parr coned pressure fittings are made in two sizes, identified as types "A" and "B", for 1/4-inch and 3/8-inch tubing, respectively.

### Coned Pressure Fittings

Type	A	B
Tube Size	1/4"	3/8"
Thread (D)	9/16 -18	3/4 -16
Bore (E)	3/32"	1/8"
Nut No.	35HC	326HC
Sleeve No.	40HC	366HC