Bulletin 8500MB2

Parr Instrument Company

Large Volume Reactors & Pressure Vessels

10 to 100 Liter Vessels for High-Temperature, High-Pressure Research

Designing and Building Quality Pressure Apparatus for 125 Years

Large Volume Stirred Reactors & Pressure Vessels

10 to 100 Liter Vessels for High-Temperature, High-Pressure Research

As demand has grown, so has the size of Parr vessels. Parr Instrument Company has expanded our standard stirred reactors and pressure vessel volumes to now include 10 liter to 100 liter vessel sizes. The geometry, features, and operation are very similar to that of smaller Parr reactors, but with a volume intermediate between lab-scale and traditional production scale reactors.

Parr's Series 4555 Stirred Reactors and Series 4675 Pressure Vessels offer volumes between 10 liter and 40 liters. These volumes work well for a first scale-up step from smaller laboratory scale equipment.

The larger 8500 Stirred Reactors and 8700 General Purpose Pressure Vessels with volumes ranging from 50 to 100 liters are ideally suited for larger scale-up, pilot work, and small-scale production.

Larger operating volumes may also be obtained by creating a Parallel Reactor System out of any of Parr's stirred reactors or pressure vessels.

10 L 18.75 L 30 L 40 L 50 L 100 L

Benefits

- Quality: ASME Certification and PED Certification
- Safety: Just like all Parr products, our new large volume vessels are designed in accordance with industry trusted codes and practices.
- Highly customizable

Key Features

- Pressure up to 1900 psi
- Temperatures up to 350 °C
- Available with or without stirring
- Manual or pneumatic head and vessel lift options
- Manual or actuated bottom drain valves, or tilt-to-empty
- Heating & cooling options
- High torque magnetic drives and stirrers for high viscosity applications

Industries

- Chemical
- Corrosion
- Fine chemical
- Food and beverage
- Materials science
- Petroleum
- Petrochemical
- Pharmaceutical
- Waste management

Applications

- Scale-up
- Pilot studies
- Small-scale production
- Process development
- Food additive production
- Fine chemical production
- Catalyst development
- Catalyst characterization
- Battery recycling
- Corrosion/material testing
- Polymerization development
- Polymer research
- Hydrogenation
- Hydrothermal processing
- Food processing
- Waste stream valorization (hydrothermal processing)
- Wastewater treatment

Extra heavy-duty magnetic drive

Manual or actuated bottom drain valve options available

Internal stirring and spiral cooling

Large Volume Stirred Reactors Comparison Chart, T316

Series Number: 4555				
Model Number	4558	4557	4559-30	4559-40
Volume, Liter (Gallon)	10 (2.6)	18.75 (5)	30 (7.9)	40 (10.5)
Vessel Dimensions: I.D. x Inner Depth, inches (cm)	7.75 x 12.2 (19.7 x 30.1)	9.5 x 16.3 (24.1 x 41.4)	10.25 x 22.6 (26.0 x 57.4)	11.25 x 24.5 (28.6 x 62.2)
Maximum Pressure (MAWP) psi (bar)	1900 (131) at 350 °C	1900 (131) at 350 °C	1900 (131) at 350 °C	1900 (131) at 350 °C
Low Pressure Version Available? (500 psi/34 bar at 350 °C)	No	No	Yes	Yes
Head Arrangement	Fixed	Fixed	Fixed	Fixed
Stand	Upright Floor Stand w/ Pneumatic Lift	Upright Floor Stand w/ Pneumatic Lift	Upright Floor Stand w/ Pneumatic Lift	Upright Floor Stand w/ Pneumatic Lift
Stand Dimensions: H x W x D, inches (cm)	87 x 31 x 43 (221 x 79 x 109)	95 x 31 x 43 (241 x 79 x 109)	103 x 32 x 43 (262 x 81 x 109)	105 x 32 x 43 (267 x 81 x 109)
Standard Magnetic Drive	60 in-lbs.	60 in-lbs.	FMD-120 in-lbs.	FMD-120 in-lbs.
Speed with 3/4 hp Motor and Gear Drive	3:1, 600 rpm	3:1, 600 rpm	3:1, 600 rpm	3:1, 600 rpm

Customization Possibilities: (May influence pressure rating/temperature rating, inner diameter, volume, and head space.)				
Higher Temperature	Yes, Max 500 °C	Yes, Max 500 °C	Yes, Max 500 °C	Yes, Max <500 °C
Higher Pressure Rating psi (bar)	Yes, Max 5000 (345)	Yes, Max 5000 (345)	Yes, Max 5000 (345)	Yes, Max 2900 (200)
Higher Torque	Yes	Yes	Yes	Yes
Higher Speed	Yes	Yes	Yes	Yes

Series Number: 8500		
Model Number	8500-50	8500-100
Volume, Liter (Gallon)	50 (13.2)	100 (26.4)
Vessel Dimensions: I.D. x Inner Depth, inches (cm)	13 x 24 (33.0 x 61.0)	16 x 32 (40.6 x 81.3)
Maximum Pressure (MAWP) psi (bar)	725 (50) at 200 °C	725 (50) at 200 °C
Low Pressure Version Available? (500 psi/34 bar at 350 °C)	No	No
Head Arrangement	Moveable	Moveable
Stand	3 Piece Stand w/Manual Hoist	3 Piece Stand w/Manual Hoist
Stand Dimensions: H x W x D, inches (cm)	118 x 87 x 38 (300 x 221 x 97)	118 x 87 x 38 (300 x 221 x 97)
Standard Magnetic Drive	FMD-120 in-lbs.	FMD-120 in-lbs.
Speed with 3/4 hp Motor and Gear Drive	5:1, 200 rpm	5:1, 200 rpm

Customization Possibilities: (May influence pressure rating/temperature rating, inner diameter, volume, and head space.)		
Higher Temperature	Yes, Max 300 °C	Yes, Max 300 °C
Higher Pressure Rating, psi (bar)	Yes, Max 2700 (186)	Yes, Max 2175 (150)
Higher Torque	Yes	Yes
Higher Speed	No	No

Options available:

- Bottom Drain Valve
- Tilt-to-Empty (10 - 40 L only)
- Internal Cooling
- External Addition Device 1" Thru
- Anchor Stirrer
- Custom Ports and Fittings
- Welded Jacket

Series Number:

4555

Type:
General Purpose

Stand:
Floor Stand

Mounting Style:
Moveable or Fixed Head

Vessel Sizes, Liters (Gallons):
10 (2.6)
18.75 (5)
30 (7.9)
40 (10.5)

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

Low Pressure MAWP Rating, psi (bar):
500 (34) (30 & 40 L only)

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

Series 4555 Floor Stand Reactors, 10-40 L

Parr's 4555 Series Reactors now include models with volumes ranging from 10 to 40 liters. These large volume reactors are ideal for an initial scale-up from smaller lab-scale equipment, serving as a step before transitioning to Parr's Series 8500 Floor Stand Stirred Reactors (50–100 L). Another option for users desiring larger operating volumes is the use of multiple 30 L / 40 L reactors in parallel. This strategy may offer advantages such as higher temperature and pressure ratings compared to the 8500 Series, along with potential cost savings.

Models 4555 – 4558 are available in 10 and 18.75 liters with operating temperatures of 225 °C, 300 °C, or up to 350 °C and are offered in either the moveable or fixed head design. 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. These components may be transferred to the holding position on the right side of the stand. Vessels equipped with a bottom drain valve typically 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.

The 4559 models are available in 30 and 40 liters and come standard with operating temperatures up to 350 °C. The 4559 models are only available with a fixed head design.

These large format reactors are generally used for pilot scale or for custom chemical production purposes, usually with a variety of attachments added to the basic units. Various heaters, larger motors, higher torque magnetic stirrer drives for high viscosity applications, condensers, solids charging ports, bottom drain valves, and Tilt-to-Empty features are available.

4555 Table Floor Stand Reactor, 18.75 L (5G), Moveable Vessel removed from stand, Manual Hoist, and a 4848M Controller

4559 30L Floor Stand Reactor with Hinged Split Rings open to show Serpentine Cooling Coil and Turbine Type Impellers, with Heater and Vessel lowered via Pneumatic Lift

4555

Series 4555 Pressure Reactor System Specifications						
Shaded bar indicates specifications that change within series.						
Model Number	**4555**	**4556**	**4557**	**4558**	**4559-30L**	**4559-40L**
Approximate Volume, Liters (Gallons)	18.75 (5)	10 (2.6)	18.75 (5)	10 (2.6)	30 (7.9)	40 (10.5)
Maximum Pressure (MAWP)	1900 psi (131 bar)					
Low Pressure Option (MAWP)	N/A				500 psi (34 bar)	
Maximum Temperature						
with FKM O-ring	225 °C				N/A	
with FFKM O-ring	300 °C				N/A	
with PTFE Flat Gasket	350 °C					
Reactor Details						
Mounting Style	Moveable		Fixed Head			
Stand Type	Table Floor Stand		Floor Stand			
Closure	Split-Ring (12 Compression Bolts for Flat Gasket, no Compression Bolts for O-ring)	Split-Ring (10 Compression Bolts for Flat Gasket, no Compression Bolts for O-ring)	Split-Ring (12 Compression Bolts for Flat Gasket, no Compression Bolts for O-ring)	Split-Ring (10 Compression Bolts for Flat Gasket, no Compression Bolts for O-ring)	Split-Ring (14 Compression Bolts for Flat Gasket)	
Valve Connections	3/8" NPT Male					
Magnetic Stirrer, Model No.	A1750HC Heavy Duty or A2160HC Footless				A2170HC Footless	
Maximum Torque	60 Inch-Pounds				120 Inch-Pounds	
Impeller(s), 6-Blades	2 (5.25" dia.)	2 (3.85" dia.)	2 (5.25" dia.)	2 (3.85" dia.)	2 (5.25" dia.)	
Stirrer	3/4 hp variable speed					
Pressure Gage, Size	4.5 inches					
Range	0-2000 psi (138 bar)					
Temperature Measurement	Thermowell					
Cooling Coil	Serpentine					
Bottom Drain Valve (BDV) (optional)	Flanged, 3/4" NPT exit port, .7" thru passage					
Lift Mechanism	Manual Hoist		Pneumatic			
Heater Style	Ceramic, 3-zone	Band Heater, 3-zone				
Heater Power, Watts	4500	4250	5500	3300	5000 to 7500	
Electrical Supply						
Volts, AC	230V 1-Phase or 400-415V 3-Phase "Y"					
Maximum Load, amps	1-Phase-40 amps or 3-Phase -15 amps/leg					
Cylinder Dimensions						
I.D. x Depth, inches	9.5 x 16.3	7.75 x 12.2	9.5 x 16.3	7.75 x 12.2	10.25 x 22.6	11.25 x 24.5
Vessel Assembly Weight, pounds	354	206	355	209	460 (310 for Low Pressure)	610 (360 for Low Pressure)
Cylinder Weight, pounds	157	97	157	97	>97	>97
Reactor Dimensions						
Width x Depth w/o Controller, inches	63 x 25		31 x 43		32 x 43	32 x 43
Height, inches	91		95	87	103	105
Weight, pounds	1000	900	1000	900	1250	>1250
Spare Parts Kit	4555SPK					
Other options available. See Ordering Guide, visit www.parrinst.com, or call for more information. Weights and dimensions are estimated from the base model. Final weights and dimensions will vary based on options selected.						

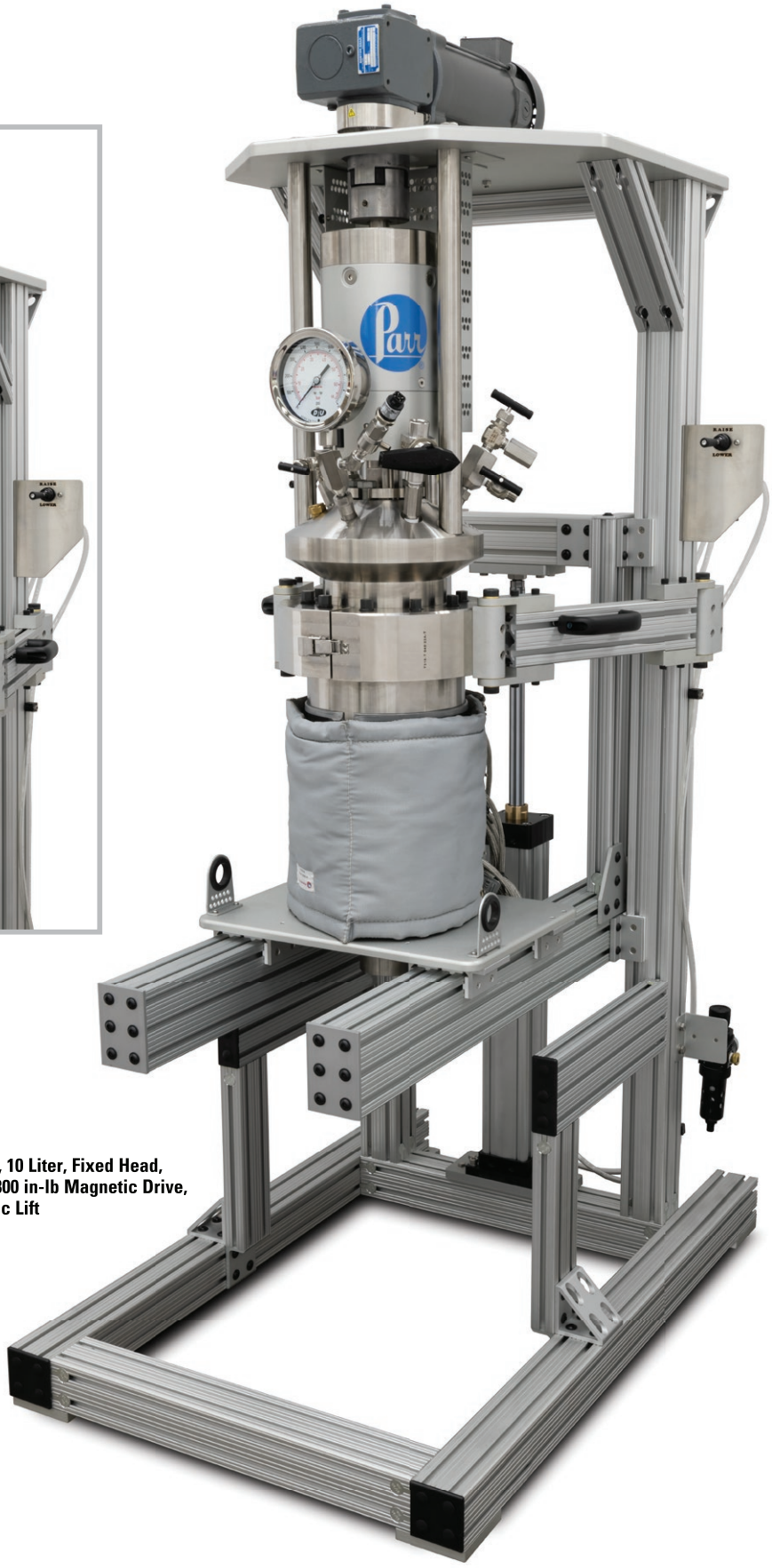
Power Requirements: *Typical power requirements for Parr's large, electrically heated reactors are 40 amp single phase or 3-Phase power sources. Users are advised to have a qualified electrician determine and install an appropriate mains power supply for the large reactor system. Large reactor systems 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.*

Series Number:

4555

Series 4555 Floor Stand Reactors, 10-40 L

Detail of the Model 4558, 10 L Reactor with 300 in-lb Magnetic Drive with hinged split rings open showing dip tube and turbine type impellers.



4558 Floor Stand Reactor, 10 Liter, Fixed Head, Flexible Mantle Heater, 300 in-lb Magnetic Drive, Split Rings and Pneumatic Lift

Series 4555 Ordering Guide

The Order No. for the Base System is: **455__-T-SS-HD-230-VS.75-2000-SC-C3-4848-ASME**

A composite identification number to be used when ordering a 4555 Series Reactor can be developed by combining individual symbols from the separate sections below.

A Base Model

Model No.	Size, Liters (Gallons)	Vessel Style
4555	18.75 (5), 9.5" ID	Moveable Head
4556	10 (2.6) 7.75" ID	Moveable Head
4557	18.75 (5), 9.5" ID	Fixed Head
4558	10 (2.6), 7.75" ID	Fixed Head
4559-30L	30 (7.9), 10.25" ID	Fixed Head
4559-40L	40 (10.5), 11.25" ID	Fixed Head

B Low Pressure Option

-No Symbol	Standard Configuration, 1900 psi (131 bar)
-LP	500 psi (34 bar) (30 L & 40 L only)

C Gasket / Maximum Temperature

-T	PTFE Flat Gasket, 350 °C
-OV	FKM O-ring, 225 °C (10 L & 18.75 L only)
-OK	FFKM O-ring, 300 °C (10 L & 18.75 L only)

D Materials of Construction

-SS	T316 Stainless Steel
-MO	Alloy 400
-IN	Alloy 600
-HB	Alloy B-2 / B-3
-HC	Alloy C-276
-CS	Alloy 20
-TI2	Titanium Grade 2
-TI4	Titanium Grade 4
-ZR702	Zirconium Grade 702
-ZR705	Zirconium Grade 705

See Chapter 1 in Bulletin 4500MB for complete list of available alloys.

E Magnetic Stirrer Drive

-HD	Heavy Duty, 60 in-lb (Included in base system for 10 L & 18.75 L)
-XHD	Extra Heavy Duty, 120 in-lb (10 L & 18.75 L only)
-FMD2	Footless Magnetic Drive, 60 in-lb (10 L & 18.75 L only)
-FMD3	Footless Magnetic Drive, 120 in-lb

F Mag. Drive Material of Construction

-MOC Symbol	Indicate Material of Construction

G Electrical Supply

-230	230 VAC, Single Phase
-400	400-415V 3-Phase "Y"

H Motor Option

-VS .75	Variable Speed, 3/4 hp
-XP .75	Explosion Proof Variable Speed, 3/4 hp
-AM .100	Air Motor, 1 hp
-GDD	Geared Direct Drive (Fixed Head only)

I Geared Direct Drive Ratio*

-3D	3:1, 0-600 rpm
-5D	5:1, 0-360 rpm
-10D	10:1, 0-180 rpm

* for -GDD Motor Option Only

J Pressure Gage

-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

K Internal Cooling Coil

-No Symbol	No Coil
-SC	Serpentine Coil

L Bottom Drain Valve

-No Symbol	No Bottom Drain Valve
-BDV	Flanged Bottom Drain Valve, 3/4" NPT exit port

M Heater Options

-C3	Ceramic, 3-zone (4555 only)
-B3	Band Heaters, 3-zone
-WJ	Welded Jacket
-MH	Flexible Mantle Heater, 1-zone, 2500 W, 200 °C Max (10 L & 18.75 L only)

N Head Lift Mechanism (Table Floor Stand only)

-EH	Electric Hoist (115 VAC)

O Controller

-4848 (included in base system)	PID Temperature Control, Ramp & Soak Programming, Motor Speed Control knob, and Data logging with Software. (RS-485 to USB cable not included.) For use with up to three additional display slots.
-4848B	Same as above but for use with up to six additional display slots.
-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 10L with Band Heaters. Required for 18.75L & 30L.)
-4848T	Touchscreen Controller with PID Temperature Control, Ramp & Soak Programming, Motor Control Module, Pressure Display Module, and either High Temperature Module or External Temperature Limit Module. Internal data logging included.
-A2110E	Motor Controller
-4871	Process Controller (for enhanced control options)

See Chapter 6 in Bulletin 4500MB for complete list of controllers and options.

P 4848 Controller Options

-TDM	Tachometer Display Module
-MCM	Motor Control Module w/set point control of RPM
-PDM	Pressure Display Module
-HTM	High Temperature Cut Off Module
-ETLM	External Temperature Limit Module
-MTM*	Motor Torque Module
-SVM	Solenoid Valve Module (for cooling control)
-A1925E4	RS-485 to USB Cable for 4848 Controller (required for data logging)
-A1925E6	RS-485 to USB Converter, isolated, 30-ft
-A2208E	RS-485 Daisy Chain for Multiple Controllers
-A3504HC	SpecView Software Package for 4838/4848 Controller

** The MTM must be installed in conjunction with the MCM.*

Q Custom Options (List All Desired)

-AS	Anchor Stirrer
-SA	Spiral Stirrer
-GE	Gas Entrainment Stirrer (10 L & 18.75 L only)
-BF	Removable Baffle Set
-XCAD	External Catalyst Addition Device
-S	Solids Charging Port (Ball Valve)
-RC	Reflux Condenser
-RTC	Reflux/Take-Off Condenser
-WJ	Welded Jacket

See Chapter 7 in Bulletin 4500MB for complete list of optional accessories.

R Certifications

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

S Spare Parts Kit

-4555SPK	Spare Parts Kit for 4555 Series

Series Number:

8500

Type:
General Purpose

Stand:
Floor Stand

Mounting Style:
Moveable Head

Vessel Sizes, Liters:
50 and 100

Standard Pressure MAWP Rating, psi (bar):
725 (50)

Standard Maximum Operating Temp., °C:
200 w/ FKM O-ring Gasket

High Temperature (HT) Maximum Operating Temperature, °C:
300 w/ PTFE Flat Gasket

Series 8500 Floor Stand Stirred Reactors, 50 & 100 L

The 8500 Series of stirred reactors, offered in 50 L, 100 L, and other large volumes, are the biggest reactors offered by Parr. This series expands the available volume of our standard offering by more than five times, while retaining the easy-to-use features our customers have come to expect from Parr. Ideally suited for scale up or pilot work, the geometry, features, and operation are very similar to that of smaller Parr reactors, but with a volume intermediate between lab-scale and traditional production scale stirred reactors.

As shown on this page, the 4848 Reactor Controller with associated 3-zone slave box allows for electric band heater control, or a jacket can be welded on the cylinder exterior for temperature control via circulator.

Modified versions are available with higher working pressure capabilities. For pressure or temperature requirements beyond the 8500 Series range, see the Series 4559 30- and 40-liter reactors. Larger operating volumes can also be achieved by configuring a Parallel Reactor System using any of Parr's stirred reactors or pressure vessels.

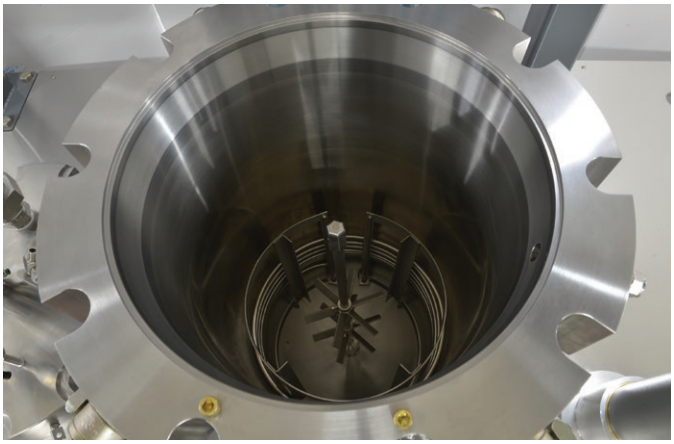
These systems can be customized with higher-torque magnetic drives and motors for high-viscosity applications. Popular accessories include condensers, solids charging ports, and bottom drain valves. As with other Parr vessels, these reactors can be constructed of a variety of commercially available corrosion-resistant alloys.

100 L Stirred Reactor System with manual bottom drain valve.

8500

Series 8500 Pressure Reactor System Specifications		
Shaded bar indicates specifications that change within series.		
Model Number	**8500**	
Approximate Volume, Liter (Gallon)	50 (13.2)	100 (26.4)
Maximum Pressure (MAWP)	725 psi (50 bar)	
Maximum Temperature	200 °C	
Reactor Details		
Mounting Style	Moveable	
Stand Type	Table Floor Stand	
Closure	8 Parr Qik-Latch Bolts	10 Parr Qik-Latch Bolts
Valve Connections	3/8" Male NPT	
Magnetic Drive, Model No.	A2170HC10 120 in-lbs Extra Heavy Duty or A4370HC 300 or 600 in-lbs Extra-Extra Heavy Duty	
Maximum Torque	600 Inch-Pounds	
Impeller(s), 6 blades	2 (6" dia.)	
Stirrer Motor	3/4 hp variable speed	
Pressure Gage, Size	4-1/2 inches	
Range	0-1000 psi (69 bar)	
Temperature Measurement	Type J Thermocouple	
Cooling Coil (optional)	Spiral	
Bottom Drain Valve (BDV) (optional)	Flanged, 3/4" NPT exit port	
Head Lift Mechanism	Manual or Electric Hoist	
Heater Style	Band Heater, 3-Zone or Welded Jacket	
Heater Power, Watts	8 kW	10 kW
Electrical Supply		
Volts, AC		
Maximum Load, amps, 115 / 230	230V, 1P or 400-415V 3-Phase “WYE”, 8 kW	400-415V 3-Phase “WYE”, 10 kW
Cylinder Dimensions		
I.D. x Depth, inches (cm)	13 x 24 (33 x 61)	16 x 32 (40 x 81)
Cylinder/Head Weight, T3166SS, pounds (kg)	350/175 (160/80)	575/275 (260/125)
Stand Dimensions		
Height x Width x Depth inches (m)	120 x 90 x 40 (3.1 x 2.3 x 1.0)	
Spare Parts Kit	8500SPK	
Other options available. See Ordering Guide, visit www.parrinst.com, or call for more information.		

100 L Stirred Reactor with head assembly removed and shown “parked” in the stand.



A look into the 100 L Stirred Reactor vessel showing stirrer and spiral cooling coil.

Series Number:
8500

Series 8500 Floor Stand Stirred Reactors, 50 & 100 L

Features include

- Maximum Pressure (MAWP), 725 psi (50 bar)
- Maximum Temperature, 200 °C
- PID temperature control with ramp and soak programming
- Variable speed motor and gear drive
- Three zone band heater or welded jacket
- Hoist for reactor head (manual or electric options)
- Bottom drain valve (actuated or manual options)
- Control thermocouple

Standard head fittings & internals include:

- FKM O-ring head seal
- Extra heavy duty magnetic drive
- Stir shaft and stirrer assembly
- Safety rupture disc assembly
- Pressure gage with optional pressure relief valve
- Gas inlet and release needle valves
- External solids charge assembly
- Spiral cooling coil
- Custom options available

The moveable head is raised using the built-in manual hoist.

Series 8500 Ordering Guide

The Order No. for the Base System is: **8500-__Liter-OV-SS-XHD-400-VS.75-1000-B3-MH-4848MB-ASME**

A composite identification number to be used when ordering a 8500 Series Reactor can be developed by combining individual symbols from the separate sections below.

A Vessel Volume	
-50L	50 Liter, 13 in (33 cm) I.D.
-100L	100 Liter, 16 in (40 cm) I.D.

B Gasket / Maximum Temperature	
-T	PTFE Flat Gasket, 300 °C
-OV	FKM O-ring, 200 °C

C Materials of Construction	
-SS	T316 Stainless Steel
-IN600	Alloy 600
-HC	Alloy C-276

See Chapter 1 in Bulletin 4500MB for complete list of available alloys.

D Magnetic Stirrer Drive	
-XHD	Extra Heavy Duty, 120 in-lb
-XX300	Extra-Extra Heavy Duty, 300 in-lb
-XX600	Extra-Extra Heavy Duty, 600 in-lb

E Mag. Drive Material of Construction	
-SS	T316 Stainless Steel
-IN600	Alloy 600
-HC	Alloy C-276

F Electrical Supply	
-230	230 VAC (50 Liter only)
-400	400-415V 3-Phase

G Motor Option	
-VS .75	Variable Speed, 3/4 hp
-VS 1	Variable Speed, 1 hp or larger

H Geared Direct Drive Ratio	
-5D	5:1, 0-200 rpm
-10D	10:1, 0-180 rpm

I Pressure Gage (VGR Required)	
- No Symbol	No Pressure Gage
-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

J Bottom Drain Valve	
-No Symbol	No Bottom Drain Valve
-BDV	Flanged Bottom Drain Valve, 3/4" NPT exit port

K Heater Options	
-No Symbol	No Heater
-B3	Band Heaters, 3-Zone
-WJ	Welded Jacket

L Head Lift Mechanism	
-EH115	Electric Hoist (115 VAC)
-EH230	Electric Hoist (230 VAC)

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

M Controller	
-4848M	Master Controller
-4848B	PID Temperature Control, Ramp & Soak Programming, Motor Speed Control knob, and Data logging with Software. (RS-485 to USB cable not included.) For use with up to six additional display slots.
-4871	Process Controller (for enhanced control options)

See Chapter 6 in Bulletin 4500MB for complete list of controllers and options.

N 4848 Controller Options	
-TDM	Tachometer Display Module
-MCM	Motor Control Module w/set point control of RPM
-PDM	Pressure Display Module
-HTM	High Temperature Cut Off Module
-ETLM	External Temperature Limit Module
-MTM*	Motor Torque Module
-SVM	Solenoid Valve Module (for cooling control)
-A1925E4	RS-485 to USB Cable for 4848 Controller (required for data logging)
-A1925E6	RS-485 to USB Converter, isolated, 30-ft
-A3504HC	SpecView Software Package for 4838/4848 Controller

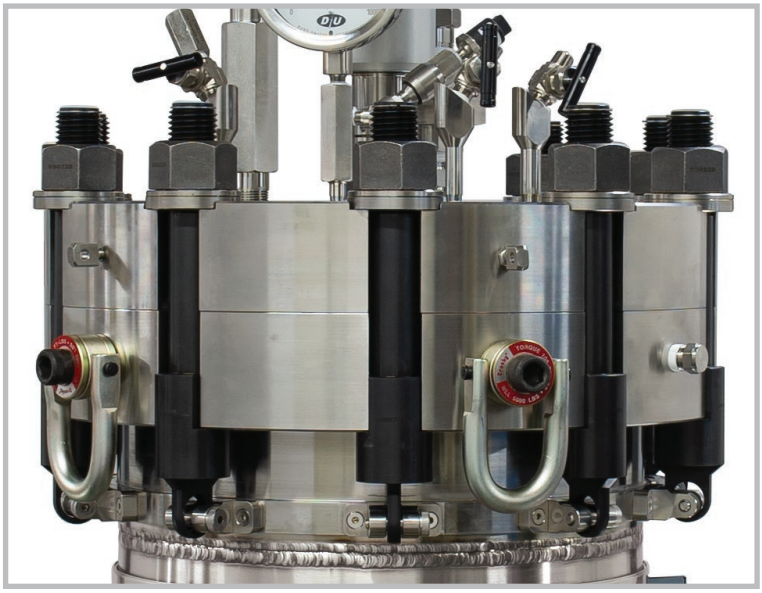
** The MTM must be installed in conjunction with the MCM.*

O Optional Fittings & Custom Options (Check all desired)	
-Spiral	Spiral Cooling Coil
-XCAD	External Catalyst Addition Device
-SCP	Solids Charging Port (Ball Valve)
-U-bar	U-bar Anchor Stirrer

See Chapter 7 in Bulletin 4500MB for complete list of optional accessories.

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

Q Spare Parts Kit	
-8500SPK	Spare Parts Kit with two Alloy 600 safety rupture discs



Ten bolts secure the head to the 100 L vessel.

Series Number:

4675

Type:
General Purpose

Stand:
Floor Stand

Mounting Style:
Moveable or Fixed Head

Vessel Sizes, Liters (Gallons):
10 (2.6)
18.75 (5)
30 (7.9)
40 (10.5)

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

Low Pressure MAWP Rating, psi (bar):
500 (34) (30 & 40 L only)

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

Series 4675 General Purpose Vessel Systems, 10-40 L

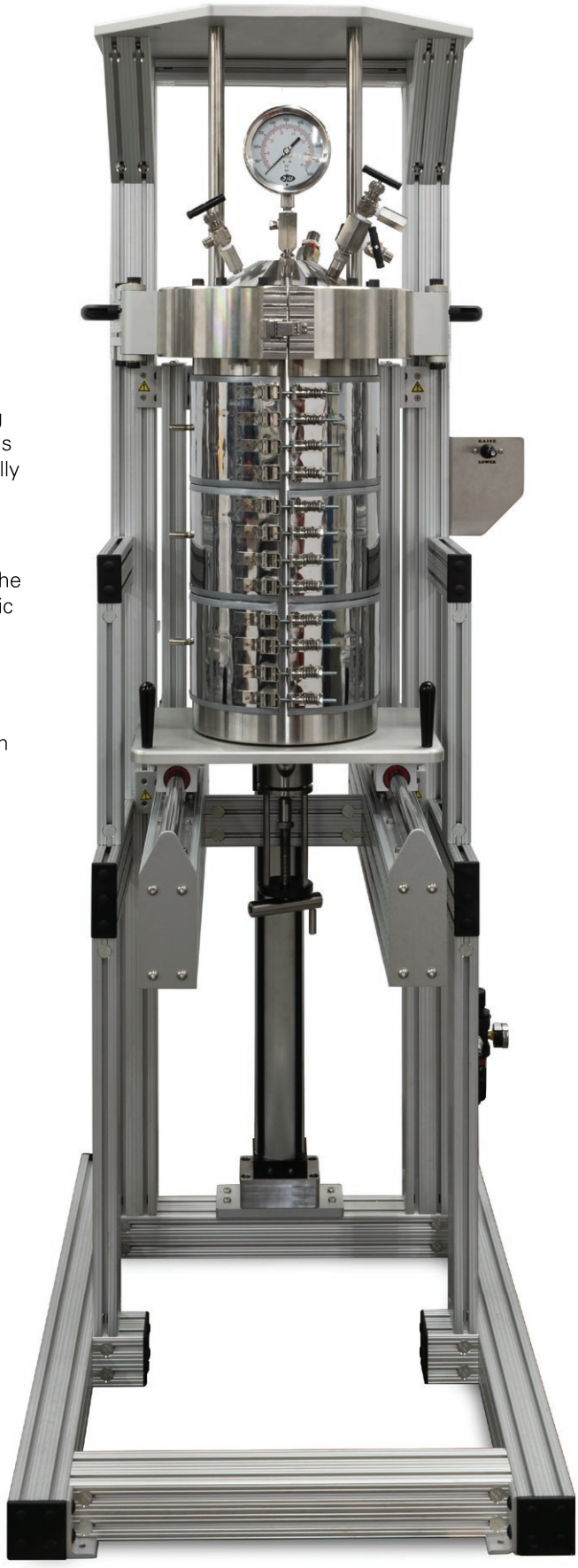
The Series 4675 General Purpose Vessels have volumes ranging from 10 to 40 liters. The 10- and 18.75-liter vessel styles are available in either a moveable head or fixed head design. These vessels can be equipped with an FKM O-ring seal for operating temperatures up to 225 °C, an FFKM O-ring for temperatures up to 300 °C, or a flat PTFE gasket for operating temperatures up to a maximum of 350 °C.

In the moveable head design, the vessel is held in a support system that minimizes the physical effort required to handle these heavy components. A hoist attached to a support column provides a convenient means of lifting the head and cylinder out of the stand. Vessels equipped with a bottom drain valve will typically remain in the heater during use, 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. A pneumatic lift enables the cylinder to be raised and lowered. When lowered, the cylinder can be slid forward for cleaning and servicing.

The 30 and 40 liter vessels are available only in a fixed head design and come standard with operating temperatures up to 350 °C.

These large format vessels are typically used for pilot scale or for custom chemical production purposes, often with a variety of attachments added to the basic units.



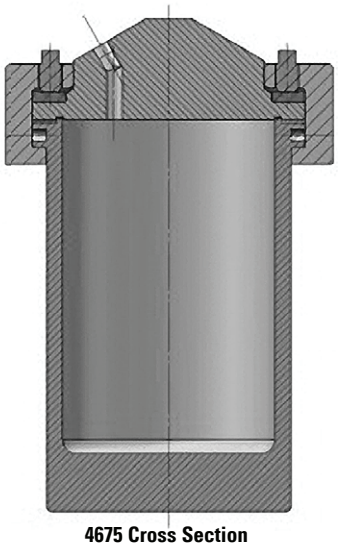
4675 30L Fixed Head Vessel in a Floor Stand with Pneumatic Lift

4675

Series 4675 Pressure Vessel Specifications				
Shaded bar indicates specifications that change within series.				
Model Number	**4675**			
Approximate Volume, Liter (Gallon)	10 (2.6)	18.75 (5)	30 (7.9)	40 (10.5)
Maximum Pressure (MAWP)	1900 psi (131 bar)			
Low Pressure Option (MAWP)	N/A		500 psi (34 bar)	
Maximum Temperature				
with FKM O-Ring	225 °C		N/A	
with FFKM O-Ring	300 °C		N/A	
with PTFE Flat Gasket	350 °C			
Vessel Details				
Mounting Style	Moveable or Fixed Head		Fixed Head	
Closure	Split-Ring with 10 Compression Bolts	Split-Ring with 12 Compression Bolts	Split-Ring with 14 Compression Bolts	
Head Opening Options	One head opening (1/4" NPT, 3/8" NPT, or rupture disc assembly port) Ports for two valves, 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	3/8" NPT Female			
Pressure Gage, Size	4.5" Diameter			
Range	0-2000 psi (138 bar)			
Temperature Measurement	Thermowell			
Cooling Coil (optional)	Serpentine			
Bottom Drain Valve (BDV) (optional)	Flanged, 3/4" NPT exit port, .7" thru passage			
Stand and Heater (optional)				
Stand Type	Table Floor Stand with manual hoist (moveable head) Floor Stand with Pneumatic Lift (fixed head)		Floor Stand with Pneumatic Lift	
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)	Band Heater, 3-zone	
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	7.75 x 12.2	9.5 x 16.3	10.25 x 22.6	11.25 x 24.5
Moveable Vessel Assembly Weight, pounds*	194	335	N/A	N/A
Fixed Vessel Assembly Weight, pounds*	195	336	290	>290
Cylinder Weight, pounds	97	157	210	>210
*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, or call for more information.				

Series 4675 General Purpose Vessel Systems, 10-40 L

Model 4675-10L General Purpose Vessel



4675 Cross Section

Series 4675 Ordering Guide

An example order number for a vessel in this series is: **4675-18.75L-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.

A Vessel Rating	
-No Symbol	Standard Configuration, 1900 psi (131 bar)
-LP	500 psi (34 bar) (30 L & 40 L only)

B Vessel Volume	
-10L	10 Liter (2.6 Gallon), 7.75" ID
-18.75L	18.75 Liter (5 Gallon), 9.5" ID
-30L	30 Liter (7.9 Gallon), 10.25" ID
-40L	40 Liter (10.5 Gallon), 11.25" ID

C Head Mounting Style	
-No Symbol	Moveable Head (10 L & 18.75 L only)
-FH	Fixed Head

D Gasket / Maximum Temperature	
-T	PTFE Flat Gasket, 350 °C
-OV	FKM O-ring, 225 °C (10 L & 18.75 L only)
-OK	FFKM O-ring, 300 °C (10 L & 18.75 L only)

E 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 Chapter 1 in Bulletin 4500MB for complete list of available alloys.

F 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	Two valves, pressure gage, rupture disc assembly, & thermowell
-NS	Non-standard, custom head opening

G Optional Fittings & Custom Options (List all needed)	
-VD	Single Valve on head w/ dip tube (VGR Required)
-DVD	Double Valve Assembly on head w/ dip tube (VGR Required)
-SC	Serpentine Cooling Coil
-BDV	Flanged Bottom Drain Valve, 3/4" NPT exit port
-XCAD	External Catalyst Addition Device (1" through)
-SCP	Solids Charging Port (Ball Valve)
-RC	Reflux Condenser
-RTC	Reflux/Take-Off Condenser

H 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

I Stand Type	
-No Symbol	None
-FS	Floor Stand, Table Support with Manual Lift (Moveable Head, 10 L & 18.75 L only)
-FS-EH	Floor Stand, Table Support with Electric Hoist (115 VAC) (Moveable Head, 10 L & 18.75 L only)
-FSP	Floor Stand with Pneumatic Lift (Fixed Head)

J Heater Options (require stand)	
-No Symbol	None
-C3	Ceramic, 3-Zone (Moveable Head, 18.75 L only)
-B3	Band Heaters, 3-zone
-WJ	Welded Jacket
-FM	Flexible Mantle Heater, 1-zone, 2500 W, 200 °C max. (10 L & 18.75 L only)

K Controller	
-No Symbol	None
-4838	PID Control, Ramp & Soak Programming, and Data logging with Software. For use with one additional display module. (Available only for 10L/18.75 L with Flexible Mantle Heater or 10 L 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 in Bulletin 4500MB for complete list of controllers and options.

L 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

M 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"

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

Series Number:

8700

Series 8700 General Purpose Pressure Vessels, 50 & 100 L

Type:
General Purpose

Stand:
Floor Stand

Mounting Style:
Moveable Head

Vessel Sizes, Liters:
50 and 100

Standard Pressure MAWP Rating, psi (bar):
725 (50)

Standard Maximum Operating Temp., °C:
200 w/ FKM O-ring Gasket

High Temperature (HT) Maximum Operating Temperature, °C:
300 w/ PTFE Flat Gasket

The 8700 Series Pressure Vessels, offered in 50 liters and 100 liters are the biggest vessels offered by Parr. This series expands the available volume of our standard offering by more than five times, while retaining the easy-to-use features our customers have come to expect from Parr. Ideally suited for scale-up or pilot work, the geometry, features, and operation are very similar to that of smaller Parr vessels, but with a volume intermediate between lab-scale and traditional production scale vessels.

Modified versions are available with higher working pressure capabilities. For pressure or temperature requirements beyond the 8700 Series range, see the Series 4675 30- and 40-liter vessels.

Popular accessories include condensers, solids charging ports, and bottom drain valves. These vessels can also be constructed of a variety of commercially available corrosion-resistant alloys.

Model 8700-100L General Purpose Pressure Vessel

100 L vessel with one Qik-Latch Bolt open

8700

Series 8700 Pressure Vessel System Specifications		
Shaded bar indicates specifications that change within series.		
Model Number	**8700**	
Approximate Volume, Liter (Gallon)	50 (13.2)	100 (26.4)
Maximum Pressure (MAWP)	725 psi (50 bar)	
Maximum Temperature	200 °C	
Reactor Details		
Mounting Style	Moveable	
Closure	8 Parr Qik-Latch Bolts	10 Parr Qik-Latch Bolts
Head Opening Options	Ports for two valves, gage, rupture disc, and thermowell with thermocouple (VGR) Custom port option (Contact our technical sales department to discuss options)	
Maximum Head Options	12 (Dependent on opening size, and required fittings)	
Valve Connections	3/8" Male NPT	
Pressure Gage, Size	4.5" Diameter	
Range	0-1000 psi (69 bar)	
Temperature Measurement	Type J Thermocouple	
Cooling Coil (optional)	Spiral	
Bottom Drain Valve (BDV) (optional)	Flanged, 3/4" NPT exit port	
Stand with Heater (Optional)		
Stand Styles	Three piece stand with manual or electric hoist	
Heater Options	3-Zone Band Heater or Welded Jacket	
Electrical Supply	230V, 1P or 400-415V 3-Phase "WYE", 8 kW	400-415V 3-Phase "WYE", 10 kW
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.*	
Weight & Dimensions		
I.D. x Depth, inches (cm)	13 x 24 (33 x 61)	16 x 32 (40 x 81)
Cylinder/Head Weight, T3166SS, pounds (kg)	350 (160)	575 (260)
Head Weight, T3166SS, pounds (kg)	175 (80)	575 (125)
Stand Dimensions		
Height x Width x Depth inches (m)	120 x 90 x 40 (3.1 x 2.3 x 1.0)	
Other options available. See Ordering Guide, visit www.parrinst.com, or call for more information.		

Series Number:
8700

Series 8700 General Purpose Pressure Vessels, 50 & 100 L

Features include

- Maximum Pressure (MAWP), 725 psi (50 bar)
- Maximum Temperature, 200 °C
- PID temperature control with ramp and soak programming
- Three-zone band heater or welded jacket
- Hoist for reactor head (manual or electric options)
- Bottom drain valve (actuated or manual options)
- Control thermocouple

Standard head fittings & internals include:

- FKM O-ring, or PTFE flat gasket head seal
- Safety rupture disc assembly
- Pressure gage with optional pressure relief valve
- Gas inlet and release needle valves
- External solids charge assembly
- Spiral cooling coil
- Custom options available

100 L Non-Stirred Pressure Vessel System with manual bottom drain valve.

Series 8700 Ordering Guide

The Order No. for the Base System is: **8700-__L-OV-SS-1000-B3-4838**

A composite identification number to be used when ordering an 8700 Series Pressure Vessel System can be developed by combining individual symbols from the separate sections below.

A Vessel Volume	
-50L	50 Liter, 13 in (33 cm) I.D.
-100L	100 Liter, 16 in (40 cm) I.D.

B Gasket / Maximum Temperature	
-T	PTFE Flat Gasket, 300 °C
-OV	FKM O-ring, 200 °C

C Materials of Construction	
-SS	T316 Stainless Steel
-IN600	Alloy 600
-HC	Alloy C-276

See Chapter 1 in the 4500MB for a complete list.

D Pressure Gage (VGR Required)	
- No Symbol	No Pressure Gage
-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

E Bottom Drain Valve	
-No Symbol	No Bottom Drain Valve
-BDV	Flanged Bottom Drain Valve, 3/4" NPT exit port

F Heater Options	
-No Symbol	No Heater
-B3	Band Heaters, 3-Zone
-WJ	Welded Jacket

G Head Lift Mechanism	
-EH115	Electric Hoist (115 VAC)
-EH230	Electric Hoist (230 VAC)

H Controller	
-No Symbol	None
-4838	PID Control, Ramp & Soak Programming, and Data logging with Software. For use with one additional display module. (Available only for 10L/18.75L with Flexible Mantle Heater or 10L with Band Heaters.)
-4848M	Master Controller
-4838	PID Temperature Control, Ramp & Soak Programming, Motor Speed Control knob, and Data logging with Software. (RS-485 to USB cable not included.) For use with up to six additional display slots.

See Chapter 6 in the 4500MB for a complete list of controllers and options.

I 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 4848 Controller (required for data logging)
-A1925E6	RS-485 to USB Converter, isolated, 30-ft
-A3504HC	SpecView Software Package for 4838/4848 Controller

** The MTM must be installed in conjunction with the MCM.*

J Optional Fittings & Custom Options (Check all desired)	
-Spiral	Spiral Cooling Coil
-XCAD	External Catalyst Addition Device
-SCP	Solids Charging Port (Ball Valve)

See Chapter 7 in the 4500MB for a complete list of optional accessories.

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

L Spare Parts Kit	
-8700SPK	Spare Parts Kit with two Alloy 600 safety rupture discs

The 8700's moveable head shown stored in the available stand.

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

Notes

The Parr Limited Warranty

Parr Instrument Company (Parr) combustion bombs, calorimeters, reactors, pressure vessels and associated products are designed and manufactured only for use by or under the direct supervision of trained professionals in accordance with specifications and instructions for use supplied with the products. For that reason, Parr sells only to professional users or distributors to such users. Parr produces precision equipment and associated products which are **not intended for general commercial use.**

EXCLUSIVE WARRANTY

To the extent allowed by law, the express and limited warranties herein are the sole warranties. **Any implied warranties are expressly excluded,** including but not limited to implied warranties of merchantability or fitness for a particular purpose.

WARRANTY CONDITIONS:

1. **Non-assignable.** The warranties herein extend only to the original purchaser-user and to the distributors to such users. These warranties or any action or claims based thereon are **not assignable or transferable.**
2. **Use of product.** The warranties herein are applicable and enforceable only when the Parr product:
   a. Is installed and operated in strict accordance with the written instructions for its use provided by Parr.
   b. Is being used in a lawful manner.
   c. Has not been modified by any entity other than Parr Instrument Company.
   d. Has been stored or maintained in accordance with written instructions provided by Parr, or if none were provided, has been stored and maintained in a professionally reasonable manner.
3. **The user's responsibility.** Parr engineers and sales personnel will gladly discuss available equipment and material options with prospective users, but the final responsibility for selecting a reactor, pressure vessel or combustion bomb which has the capacity, pressure rating, chemical compatibility, corrosion resistance and design features required to perform safely and to the user's satisfaction in any particular application or test must rest entirely with the user – not with Parr. It is also the user's responsibility to install the equipment in a safe operating environment and to train all operating personnel in appropriate safety, operational and maintenance procedures.
4. **Warranty period.** Unless otherwise provided in writing by Parr, the warranties herein are applicable for a period of one year from date of delivery of the product to the original purchaser/user. Note, however, that there is no guarantee of a service life of one year after delivery.
5. **Notification.** To enforce any express warranty created herein, the purchaser/user must notify Parr in writing within thirty (30) days of the date any defect is detected. Upon request of Parr, the part or product involved must be returned to Parr in the manner specified by Parr for analysis and non-destructive testing.

EXPRESS WARRANTIES

Subject to the above Conditions, Parr expressly warrants that its products:

1. Are as described in the applicable Parr sales literature, or as specified in Parr shipping documents.
2. Will function as described in corresponding Parr sales bulletins or, for specially engineered assemblies, as stated in the sales proposal and purchase agreement.
3. Will remain free from defects in materials and workmanship for the Warranty Period.

LIMITATIONS ON THE PARR WARRANTY

As to the original purchaser/user and to the distributors to such users, Parr limits its liability for claims other than personal injury as follows:

1. **Replacement or repair.** With respect to express warranties herein, Parr's only obligation is to replace or repair any parts, assemblies or products not conforming to the warranties provided herein.
2. **Disclaimer of consequential damages.** In no event shall Parr be liable for consequential commercial damages, including but not limited to: damages for loss of use, damages for lost profits, and damages for resulting harm to property other than the Parr product and its component parts.

INDEMNITY AND HOLD HARMLESS

Original purchaser-user agrees to indemnify and hold Parr harmless for any personal injuries to original purchaser-user, its employees and all third parties where said injuries arise from misuse of Parr products or use not in accordance with specifications and instructions for use supplied with the Parr products.

Parr Instrument Company

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