



## Research Products

High Pressure, High Temperature Reaction and Pressure Vessel Products

Instrumentation Products Division



ENGINEERING YOUR SUCCESS.

## Parker Autoclave Engineers



Based in Erie, Pennsylvania, Parker Autoclave Engineers is an operation of the Instrumentation Products Division of Parker Hannifin Corporation.

Parker Autoclave Engineer Research was founded by Fred Gasche in 1945 to fill a gap in the world of high pressure and high temperature technology. Parker Autoclave Engineers has created and produced many novel pressure vessel designs as well as significant breakthroughs in high pressure technology such as the MagneDrive<sup>®</sup>, a magnetically coupled agitator. We have made these developments through commitments to constant innovation and providing the best standards in product quality and service.

### **Applications include:**

Downhole simulation, catalyst research, gas dispersion, liquid blending, solid suspension, monitoring and control of pressures, temperatures, mixing speed, gas flow, reactor functions, high-pressure pumping and much more.

The Instrumentation Products Division of Parker Hannifin provides highly engineered pressure and temperature process control instrumentation and systems. These range from compression tube fittings, cone and thread fittings, needle valves, ball valves, compact stream switching valves to modular process to instrument valve packages. These items are all developed and manufactured to increase our customer's up-time, maintain safety, improve production and quality control. Parker is equally committed with assisting our customers in decreasing their downtime, labor and maintenance costs. Our Instrumentation products are designed and developed with our customer's application requirements in mind. Parker is working closely with our customers in new opportunities and the various associated solutions to those instrumentation application issues.

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# Mini-Reactor

50 ml and 100 ml

ID = 1.38" (35mm)



## Principle of Operation:

The Parker Autoclave Engineers' Mini-Reactor is a highly capable design incorporating all features found in a full size laboratory reactor at reduced internal volumes. The low cost of full features makes the Mini-Reactor ideal for parallel studies. A lower volume reduces both reactant requirements and disposal costs, while a smaller foot print reduces costly laboratory and fume hood requirements. The 50 and 100 ml volumes share the same closure geometry and the vessel bodies are interchangeable. The elastomer seal allows the Mini-Reactor to achieve high pressure with a finger-tight seal.

## General Specifications:

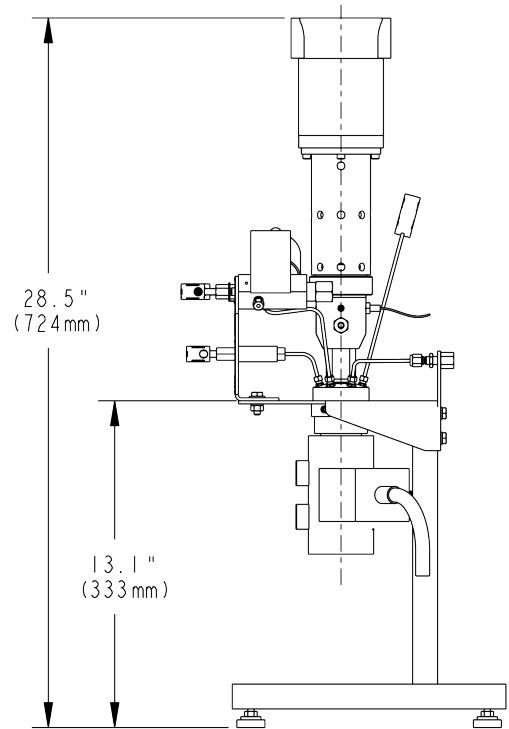
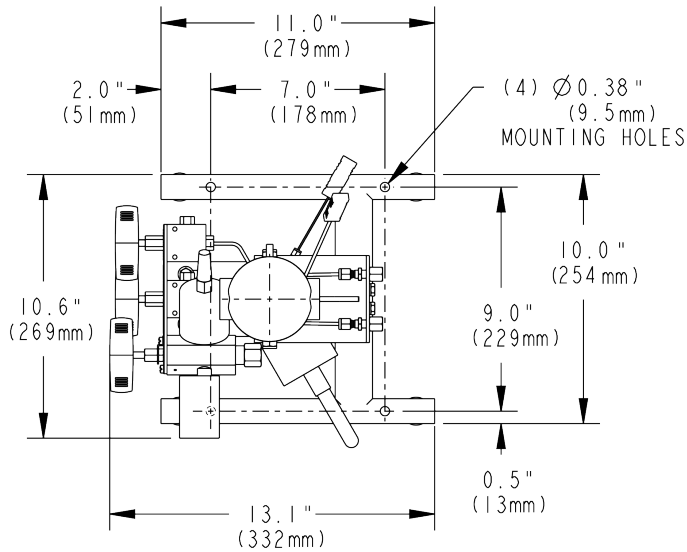
Maximum Allowable Working Pressure: (MAWP)
2,900 psi @ 600°F (200 Bar @ 315°C) <span style="background-color: yellow;">Note</span>
Maximum Recommended Operating Pressure:
2,500 psi @ 527°F (172 Bar @ 275°C) with PH-MSK O-ring
Material of Construction:
316 Stainless Steel
Hastelloy® C

## Standard/Optional Unit Features:

- 50 and 100 ml volumes with common closure geometry
- Elastomer seal with finger tight closure make-up
- Easy removal electric heater with over-temperature thermocouple
- Process thermocouple (Type K)
- Cooling Coil
- Liquid sample tube with valve
- Gas inlet valve
- Vent valve with pressure gauge/transducer and safety rupture disc (0-3000 psi gauge, 0-5000 psi pressure transducer)
- Bench Top Vessel Stand
  
- Optional: 50 and 100 ml volumes with common closure geometry
- Optional: In-line MagneDrive with 1/8 hp motor, speed sensor, and Dispersimax impeller
- Optional: ASME code stamp or CE Mark



## Drawing Details:



## Ordering Information:

Part Number Example	PH-M	010	SS	-	MM	NS
Category		1	2		3	4

Example: PH-M010SS-MMNS

Description: 100 ml Mini-Reactor, 316 Stainless Steel with Drive, No Code Requirements

1 - Vessel Volume Code	
005	50 ml (Mini-Reactor)
<b>010</b>	100 ml (Mini-Reactor)

2 - Vessel Material Code	
<b>SS</b>	316 Stainless Steel
HC	Hastelloy® C

3 - Mixer Code	
NS	No Mixer (port plugged)
<b>MM</b>	In-Line MagneDrive Mixer (w/Dispersion Impeller - pg. 31)

4 - Pressure Code Requirement (unit voltage)	
<b>NS</b>	No Code (120 VAC)
AS	ASME Code Stamped (120 VAC)
CE	CE Marked (240 VAC)
NE	Export with CRN (240 VAC)

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**Note** The user should be aware that the 600°F (315°C) vessel temperature rating is the maximum mean wall temperature of the vessel, as defined by the ASME B&PV Code. Many variables can affect the thermal capabilities of the vessel. These factors can include, but are not limited to, the use of insulation, whether the process is batch or continuous flow, or even a chemical process itself. These factors may have bearing on heat up rate, maximum process temperature, and the cool down rate of the reactor. These factors should be considered by the user when purchasing a system in order to verify that the equipment will reach desired operating temperature in a reasonable time period. Please consult Parker Autoclave Engineers if assistance is required.

## Optional Feature Kits/Spare Parts

(purchased separately but assembled as part of purchased Reactor if required)

- Soft Seat Vessel Closure Seal Kits
- MagneDrive Bearing Option Kits
- Internal Tube Kits
- Process Cooling Component Kits
- Solid or Liquid Catalyst Charging Kit
- Tool Kits (matched to vessel type)

For complete description of kit contents please see pages 16-19

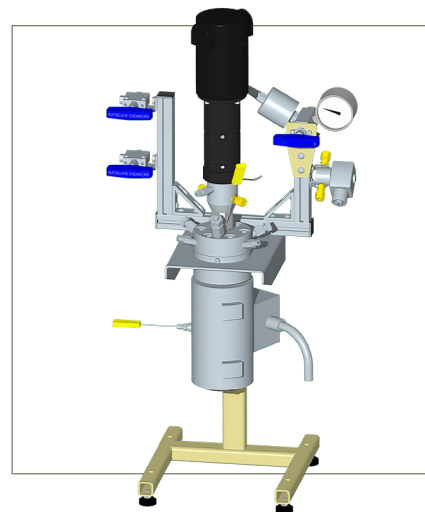
## Universal Reactor Controller (URC)

We recommend that our Reactors be operated using our URC-II control package. It provides an interface to control and monitor heater & process temperature, MagneDrive speed, and Pressure. See page 41 for information on ordering the URC-II controller.

# Bench Top EZE-Seal Reactors

150 ml and 300 ml

ID = 1.81" (46mm)

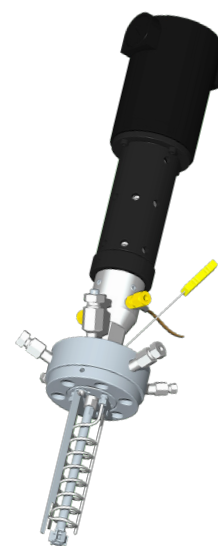


## Principle of Operation:

The Parker Autoclave Engineers' EZE-Seal Reactor has been designed for reliable high pressure operation, yet requires low torque for sealing. The seal can be a metal gasket machined from the same material as the vessel or an elastomeric seal. Many combinations of standard components are available. The cover of the unit remains fixed in the stand to permit opening of the vessel without disassembling any process connections. The body is easily removed and drops away from the cover. The EZE-Seal stirred laboratory reactor is used for chemical synthesis of corrosive, hazardous and very reactive chemicals/petrochemicals as well as solvothermal reactions.

## General Specifications:

Maximum Allowable Working Pressure: (MAWP)
2,900 psi @ 850°F (200 Bar @ 454°C) <span style="background-color: yellow;">Note</span>
Maximum Recommended Operating Pressure:
2,500 psi @ 750°F (172 Bar @ 398°C)
Material of Construction:
316 Stainless Steel
Hastelloy® C

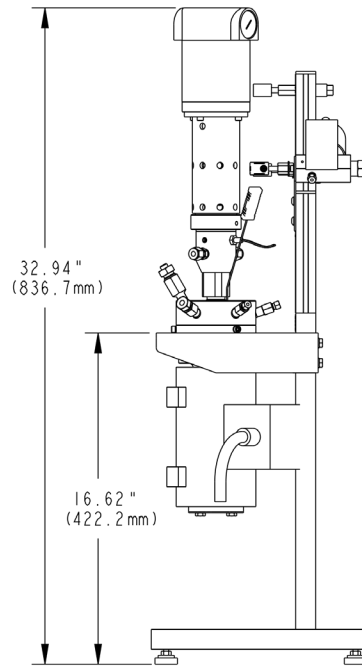
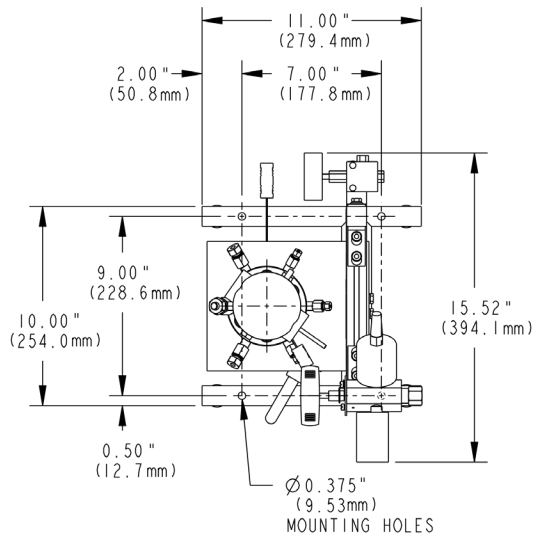


300 ml EZE-Seal Reactor  
Internals

## Standard/Optional Unit Features:

- Low torque metal seal
- Electric heater with over-temperature thermocouple
- Bench top stand
- Process thermocouple (Type K)
- Process Cooling Coil
- Liquid sample tube with valve
- Gas inlet valve
- Vent valve with pressure gauge/transducer and safety rupture disc (0-3000 PSI gauge, 0-5000 PSI, 24VDC, 4-20mA pressure transducer)
- F437FB (.195" ID) Charging Port (see Charging Port Option if needed)
  
- Optional: ASME code stamp or CE mark
- Optional: 150/300 ml companion volumes with common closure geometry
- Optional: Elastomer seal for lower temperature operation
- Optional: i2Mag in-line MagneDrive with 1/8 hp motor with Dispersimax Impeller

## Drawing Details:



## Ordering Information:

Part Number Example	PH-E	030	SS	—	MM	NS	—	XP
Category		<b>1</b>	<b>2</b>		<b>3</b>	<b>4</b>		<b>5</b>

**Example: PH-E030SS-MMNS-XP**

**Description:** 300 ml EZE-Seal Stirred Reactor, 316 Stainless Steel with Drive, No Code Requirements with Explosion Proof Option

<b>1 - Vessel Volume Code</b>	
015	150 ml
<b>030</b>	300 ml
<b>2 - Vessel Material Code</b>	
<b>SS</b>	316 Stainless Steel
HC	Hastelloy® C
<b>3 - Mixer Code</b>	
NS	No Mixer (port plugged)
<b>MM</b>	In-Line MagneDrive Mixer (w/Dispersimax Impeller - pg. 31)
<b>4 - Pressure Code Requirement (unit voltage)</b>	
<b>NS</b>	No Code (120 VAC)
AS	ASME Code Stamped (120 VAC)
CE	CE Marked (240 VAC)
NE	Export with CRN (240 VAC)
<b>5 - Explosion Proof (option)</b>	
<b>XP</b>	Explosion proof with slip-on jacket and air motor

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**Note** The user should be aware that the 850°F (454°C) vessel temperature rating is the maximum mean wall temperature of the vessel, as defined by the ASME B&PV Code. Many variables can affect the thermal capabilities of the vessel. These factors can include, but are not limited to, the use of insulation, whether the process is batch or continuous flow, or even a chemical process itself. These factors may have bearing on heat up rate, maximum process temperature, and the cool down rate of the reactor. These factors should be considered by the user when purchasing a system in order to verify that the equipment will reach desired operating temperature in a reasonable time period. Please consult Parker Autoclave Engineers if assistance is required.

## Optional Feature Kits/Spare Parts

(purchased separately but assembled as part of purchased Reactor if required)

- Soft Seat Vessel Closure Seal Kits
- MagneDrive Bearing Option Kits
- Internal Tube Kits
- Process Cooling Component Kits
- Solid or Liquid Catalyst Charging Kit
- Tool Kits (matched to vessel type)

For complete description of kit contents please see pages 16-19

## Universal Reactor Controller (URC)

We recommend that our Reactors be operated using our URC-II control package. It provides an interface to control and monitor heater & process temperature, MagneDrive speed, and Pressure. See page 41 for information on ordering the URC-II controller.

# Floor Stand EZE-Seal Reactors

500ml & 1000ml - ID = 3.00" (76mm)  
2000ml & 4000ml - ID = 5.00" (127mm)

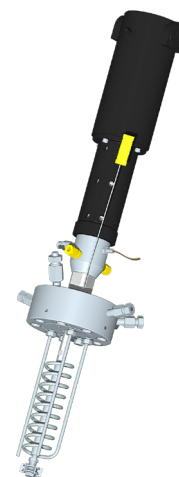


## Principle of Operation:

The Parker Autoclave Engineers' EZE-Seal Reactor has been designed for reliable high pressure operation, yet requires low torque for sealing. The seal can be a metal gasket machined from the same material as the vessel or an elastomeric seal. Many combinations of standard components are available. The cover of the unit remains fixed in the stand to permit opening of the vessel without disassembling any process connections. The body is easily removed and drops away from the cover. The EZE-Seal stirred laboratory reactor is used for chemical synthesis of corrosive, hazardous and very reactive chemicals/petrochemicals as well as solvothermal reactions.

## General Specifications:

Maximum Allowable Working Pressure: (MAWP)
2,900 psi @ 850°F (200 Bar @ 454°C)
<b>Note</b>
Maximum Recommended Operating Pressure:
2,500 psi @ 750°F (172 Bar @ 398°C)
Material of Construction:
316 Stainless Steel
Hastelloy® C



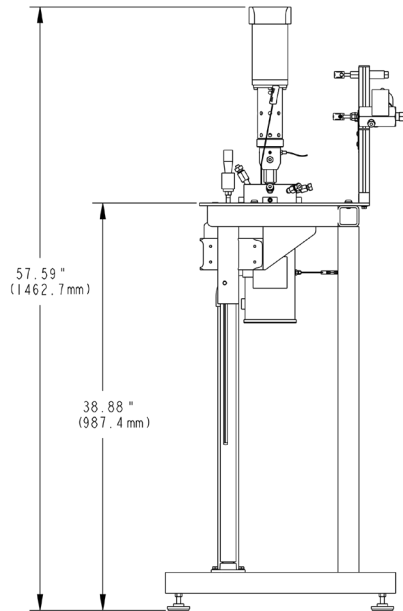
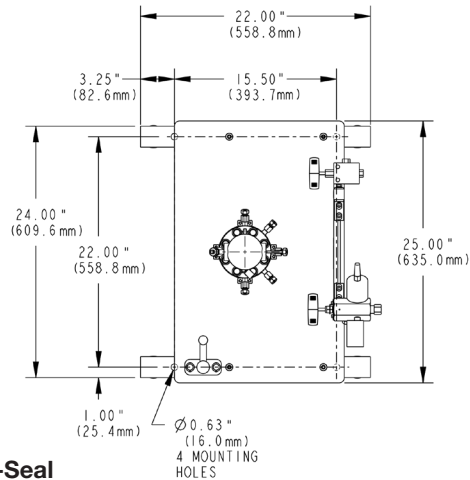
1000 ml EZE-Seal Reactor  
Internals

## Standard/Optional Unit Features:

- Low torque metal seal
- Electric heater with over-temperature thermocouple and easy body removal
- Floor stand with swing-away body lift
- Process thermocouple (Type K)
- Process Cooling Coil
- Liquid sample tube with valve
- Gas inlet valve
- Vent valve with pressure gauge/transducer and safety rupture disc (0-3000 PSI gauge, 0-5000 PSI, 24VDC, 4-20mA pressure transducer)
- F437FB (.195" ID) Charging Port (see Charging Port Option if needed)
- Optional: Mini flush valve
- Optional: ASME code stamp or CE mark
- Optional: 500/1000, and 2000/4000 ml companion volumes with common closure geometry
- Optional: Elastomer seal for lower temperature operation
- Optional: i2Mag in-line MagneDrive with 1/3 hp motor speed sensor with Dispersimax Impeller



## Drawing Details:



## Ordering Information:

Part Number Example	PH-E	400	SS	-	MM	NS	-	XP
Category		<b>1</b>	<b>2</b>		<b>3</b>	<b>4</b>		<b>5</b>

### Example: PH-E400SS-MMNS-XP

Description: 4000 ml EZE-Seal Stirred Reactor, 316 Stainless Steel, With Drive, No Code Requirements with Explosion Proof Option

1 - Vessel Volume Code	
050	500 ml
100	1000 ml
200	2000 ml
<b>400</b>	<b>4000 ml</b>

2 - Vessel Material Code	
<b>SS</b>	316 Stainless Steel
HC	Hastelloy® C

3 - Mixer	
NS	No Mixer (port plugged)
<b>MM</b>	In-Line Magnedrive Mixer (w/Dispersimax Impeller - pg. 31)

4 - Pressure Code Requirement (unit voltage)	
<b>NS</b>	None (240 VAC)
AS	ASME Code (240 VAC)
CE	CE Mark (240 VAC)
NE	Export with CRN (240 VAC)

5 - Explosion Proof (option)	
<b>XP</b>	Explosion proof with slip-on jacket and air motor

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**Note** The user should be aware that the 850°F (454°C) vessel temperature rating is the maximum mean wall temperature of the vessel, as defined by the ASME B&PV Code. Many variables can affect the thermal capabilities of the vessel. These factors can include, but are not limited to, the use of insulation, whether the process is batch or continuous flow, or even a chemical process itself. These factors may have bearing on heat up rate, maximum process temperature, and the cool down rate of the reactor. These factors should be considered by the user when purchasing a system in order to verify that the equipment will reach desired operating temperature in a reasonable time period. Please consult Parker Autoclave Engineers if assistance is required.

## Optional Feature Kits/Spare Parts

(purchased separately but assembled as part of purchased Reactor if required)

- Soft Seat Vessel Closure Seal Kits
- Magnedrive Bearing Option Kits
- Internal Tube Kits
- Process Cooling Component Kits
- Solid or Liquid Catalyst Charging Kit
- Tool Kits (matched to vessel type)

For complete description of kit contents please see pages 16-19

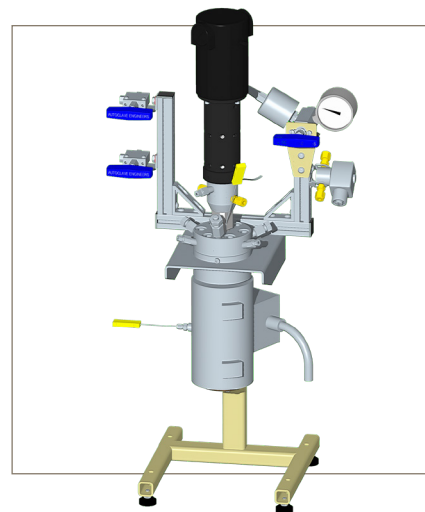
## Universal Reactor Controller (URC)

We recommend that our Reactors be operated using our URC-II control package. It provides an interface to control and monitor heater & process temperature, Magnedrive speed, and Pressure. See page 41 for information on ordering the URC-II controller.

# Bench Top Bolted Closure Reactors

150 ml and 300 ml

ID = 1.81" (46mm)

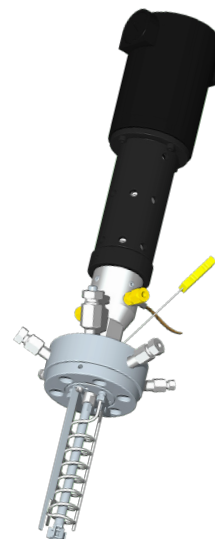


## Principle of Operation:

The Parker Autoclave Engineers' Bolted Closure Reactor has been designed for reliable high pressure operation. The seal can be a metal gasket machined from the same material as the vessel or an elastomeric seal. Many combinations of standard components are available. The cover of the unit remains fixed in the stand to permit opening of the vessel without disassembling any process connections. The body is easily removed and drops away from the cover. The bolted closure stirred laboratory reactor is used for chemical synthesis of corrosive, hazardous and very reactive chemicals/petrochemicals as well as materials research.

## General Specifications:

Maximum Allowable Working Pressure: (MAWP)
5,000 psi @ 850°F (344 Bar @ 454°C) <span style="background-color: yellow;">Note</span>
Maximum Recommended Operating Pressure:
4,300 psi @ 750°F (296 Bar @ 398°C)
Material of Construction:
316 Stainless Steel
Hastelloy® C

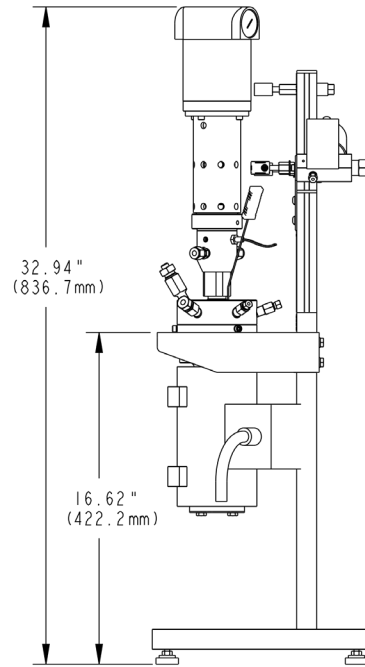
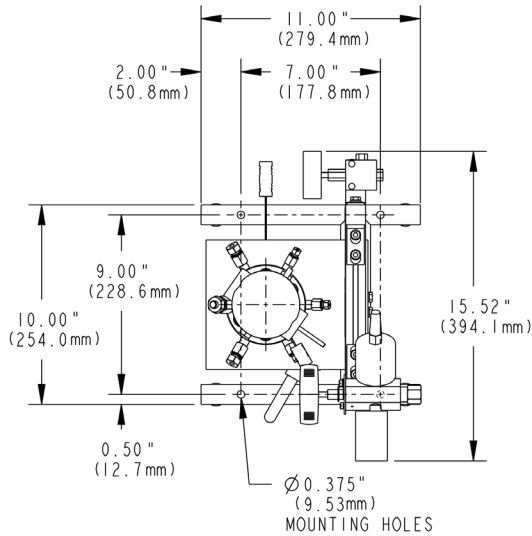


300 ml Bolted Reactor Internals

## Standard/Optional Unit Features:

- 150/300 ml companion volumes with common closure geometry
- Electric heater with over-temperature thermocouple
- Bench top stand
- Process thermocouple (Type K)
- Process Cooling Coil
- Liquid sample tube with valve
- Gas inlet valve
- Vent valve with pressure gauge/transducer and safety rupture disc (0-3000 PSI gauge, 0-5000 PSI, 24VDC, 4-20mA pressure transducer)
- F437FB (.195" ID) Charging Port (see Charging Port Option if needed)
  
- Optional: ASME code stamp or CE mark
- Optional: Elastomer seal for lower temperature operation
- Optional: 150/300 ml companion volumes with common closure geometry
- Optional: i2Mag in-line Magedrive with 1/8 hp motor with Dispersimax impeller

## Drawing Details:



## Ordering Information:

Part Number Example	PH-B	015	SS	—	MM	NS	—	XP
Category		1	2		3	4		5

**Example: PH-B015SS-MMNS-XP**

**Description:** 150 ml Bolted Closure Stirred Reactor, 316 Stainless Steel, No Mixer, No Code Requirements, with Explosion Proof Option

<b>1 - Vessel Volume Code</b>	
015	150 ml
030	300 ml
<b>2 - Vessel Material Code</b>	
SS	316 Stainless Steel
HC	Hastelloy® C
<b>3 - Mixer Code</b>	
NS	No Mixer (port plugged)
MM	In-Line Magnedrive Mixer (w/Dispersimax Impeller - pg. 31)
<b>4 - Pressure Code Requirement (unit voltage)</b>	
NS	None (120 VAC)
AS	ASME Code (120 VAC)
CE	CE Mark (240 VAC)
NE	Export with CRN (240 VAC)
<b>5 - Explosion Proof (option)</b>	
XP	Explosion proof with slip-on jacket and air motor

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**Note** The user should be aware that the 850°F (454°C) vessel temperature rating is the maximum mean wall temperature of the vessel, as defined by the ASME B&PV Code. Many variables can affect the thermal capabilities of the vessel. These factors can include, but are not limited to, the use of insulation, whether the process is batch or continuous flow, or even a chemical process itself. These factors may have bearing on heat up rate, maximum process temperature, and the cool down rate of the reactor. These factors should be considered by the user when purchasing a system in order to verify that the equipment will reach desired operating temperature in a reasonable time period. Please consult Parker Autoclave Engineers if assistance is required.

## Optional Feature Kits/Spare Parts

(purchased separately but assembled as part of purchased Reactor if required)

- Soft Seat Vessel Closure Seal Kits
- Magnedrive Bearing Option Kits
- Internal Tube Kits
- Process Cooling Component Kits
- Solid or Liquid Catalyst Charging Kit
- Tool Kits (matched to vessel type)
- Flush Valve Kit

For complete description of kit contents please see pages 16-19

## Universal Reactor Controller (URC)

We recommend that our Reactors be operated using our URC-II control package. It provides an interface to control and monitor heater & process temperature, Magnedrive speed, and Pressure. See page 41 for information on ordering the URC-II controller.

# Floor Stand Bolted Reactors

500ml & 1000ml - ID = 3.00" (76mm)  
2000ml & 4000ml - ID = 5.00" (127mm)

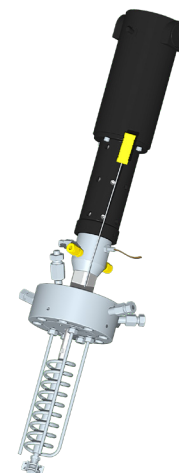


## Principle of Operation:

The Parker Autoclave Engineers' Bolted Closure Reactor has been designed for reliable high pressure operation. The seal can be a metal gasket machined from the same material as the vessel or an elastomeric seal. Many combinations of standard components are available. The cover of the unit remains fixed in the stand to permit opening of the vessel without disassembling any process connections. The body is easily removed and drops away from the cover. The bolted closure stirred laboratory reactor is used for chemical synthesis of corrosive, hazardous and very reactive chemicals/petrochemicals as well as materials research.

## General Specifications:

Maximum Allowable Working Pressure: (MAWP)
5,000 psi @ 850°F (344 Bar @ 454°C) <span style="float: right;">Note</span>
Maximum Recommended Operating Pressure:
4,300 psi @ 750°F (296 Bar @ 398°C)
Material of Construction:
316 Stainless Steel
Hastelloy® C



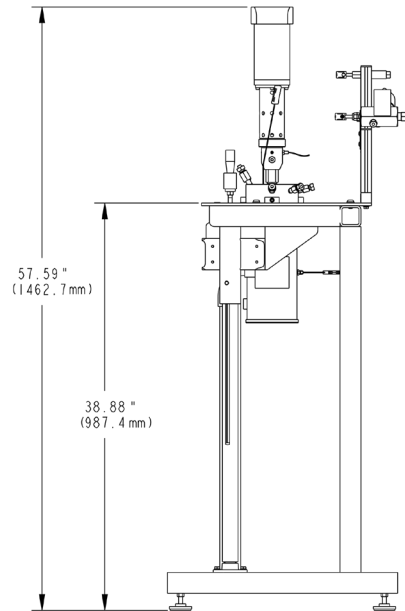
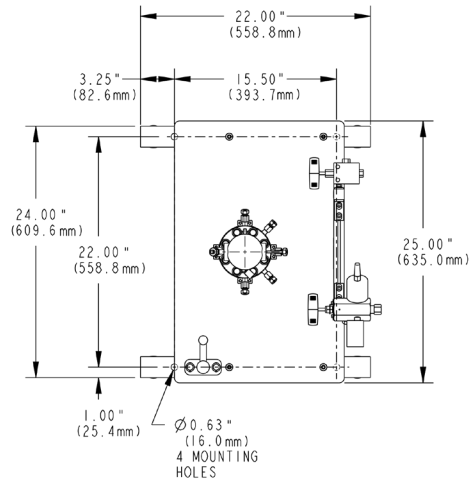
1000 ml Bolted Reactor Internals

## Standard/Optional Unit Features:

- Electric heater with over-temperature thermocouple and easy body removal
- Floor stand with swing-away body lift
- Process thermocouple (Type K)
- Process Cooling Coil
- Liquid sample tube with valve
- Gas inlet valve
- Vent valve with pressure gauge/transducer and safety rupture disc (0-3000 PSI gauge, 0-5000 PSI, 24VDC, 4-20mA pressure transducer)
- F437FB (.195" ID) Charging Port (see Charging Port Option if needed)
- Optional: Mini flush valve
- Optional: ASME code stamp or CE mark
- Optional: Elastomer seal for lower temperature operation
- Optional: 500/1000, and 2000/4000 ml companion volumes with common closure geometry
- Optional: i2Mag in-line Magnedrive with 1/3 hp motor speed sensor with Dispersimax impeller

## Drawing Details:

### 1000ml Bolted



## Ordering Information:

Part Number Example	PH-B	400	SS	—	MM	NS	—	XP
Category		<b>1</b>	<b>2</b>		<b>3</b>	<b>4</b>		<b>5</b>

#### Example: PH-B400SS-MMNS-XP

Description: 4000 ml Bolted Closure Reactor, 316 Stainless Steel, With Drive, No Code Requirements with Explosion Proof Option

1 - Vessel Volume	
050	500 ml
100	1000 ml
200	2000 ml
<b>400</b>	<b>4000 ml</b>

2 - Vessel Material Code	
<b>SS</b>	316 Stainless Steel
HC	Hastelloy® C

3 - Mixer Code	
NS	No Mixer (port plugged)
<b>MM</b>	<b>In-Line Magnedrive Mixer (w/Dispersion Impeller - pg. 31)</b>

4 - Pressure Code Requirement (unit voltage)	
<b>NS</b>	<b>None (240 VAC)</b>
AS	ASME Code (240 VAC)
CE	CE Mark (240 VAC)
NE	Export with CRN (240 VAC)

5 - Explosion Proof (option)	
<b>XP</b>	<b>Explosion proof with slip-on jacket and air motor</b>

Hastelloy® C is a registered trademark of Haynes International, Inc.

**Note** The user should be aware that the 850°F (454°C) vessel temperature rating is the maximum mean wall temperature of the vessel, as defined by the ASME B&PV Code. Many variables can affect the thermal capabilities of the vessel. These factors can include, but are not limited to, the use of insulation, whether the process is batch or continuous flow, or even a chemical process itself. These factors may have bearing on heat up rate, maximum process temperature, and the cool down rate of the reactor. These factors should be considered by the user when purchasing a system in order to verify that the equipment will reach desired operating temperature in a reasonable time period. Please consult Parker Autoclave Engineers if assistance is required.

## Optional Feature Kits/Spare Parts

(purchased separately but assembled as part of purchased Reactor if required)

- Soft Seat Vessel Closure Seal Kits
- Magnedrive Bearing Option Kits
- Internal Tube Kits
- Process Cooling Component Kits
- Solid or Liquid Catalyst Charging Kit
- Tool Kits (matched to vessel type)
- Flush Valve Kit

For complete description of kit contents please see pages 16-19

## Universal Reactor Controller (URC)

We recommend that our Reactors be operated using our URC-II control package. It provides an interface to control and monitor heater & process temperature, Magnedrive speed, and Pressure. See page 41 for information on ordering the URC-II controller.

# Floor Stand Zipperclave® Reactors

500ml & 1000ml - ID = 3.00" (76mm)  
2000ml & 4000ml - ID = 5.00" (127mm)

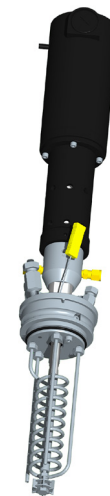


## Principle of Operation:

The Parker Autoclave Engineers' ZipperClave® Reactor has been designed to provide the researcher with a reliable quick-opening closure. The main seal of the reactor is an O-ring available in many different materials. The 500 ml, and 1000 ml share the same cover design as well as the 2,000 ml and 4,000 ml units are identical in design except for the depth of the reactor. Many combinations of standard components are available. The cover of the unit remains fixed in the stand to permit opening of the vessel without disassembling any process connections. The body is easily removed and drops away from the cover.

## General Specifications:

Maximum Allowable Working Pressure: (MAWP)
2,200 psi @ 450°F (151 Bar @ 232°C) <span style="background-color: yellow;">Note</span>
Maximum Recommended Operating Pressure:
1,900 psi @ 350°F (131 Bar @ 176°C)
Material of Construction:
316 Stainless Steel
Hastelloy® C

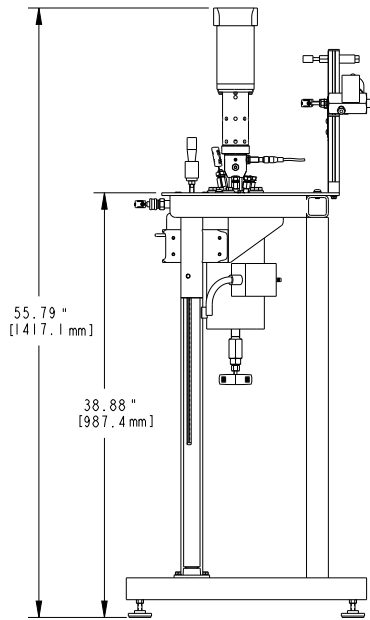
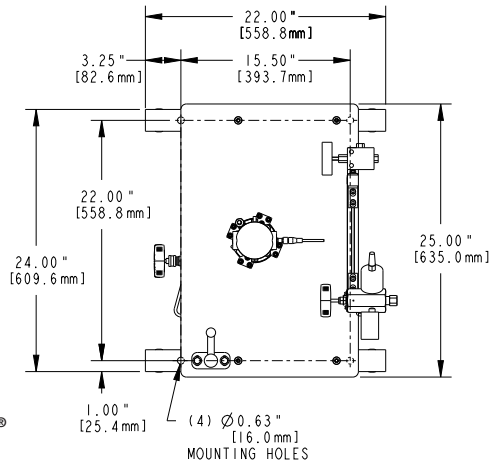


1000 ml Zipperclave® Reactor  
Internals

## Standard/Optional Unit Features:

- Electric heater with over-temperature thermocouple and easy body removal
- Floor stand with swing-away body lift
- Process thermocouple (Type K)
- Process Cooling Coil
- Liquid sample tube with valve
- Gas inlet valve
- Vent valve with pressure gauge/transducer and safety rupture disc (0-3000 PSI gauge, 0-5000 PSI, 24VDC, 4-20mA pressure transducer)
- F437FB (.195" ID) Charging Port (see Charging Port Option if needed)
- Optional: Mini flush valve
- Optional: CE mark
- Optional: 500/1000, and 2000/4000 ml companion volumes with common closure geometry
- Optional: Elastomer seal for lower temperature operation
- Optional: i2Mag in-line MagneDrive with 1/3 hp motor speed sensor with Dispersimax impeller

## Drawing Details:



## Ordering Information:

Part Number Example	PH-Z	400	SS	—	MM	NS	—	XP
Category		1	2		3	4		5

### Example: PH-Z400SS-MMNS-XP

Description: 4000 ml Zipperclave® Reactor, 316 Stainless Steel, With Drive, No Code Requirement with Explosion Proof Option

1 - Vessel Volume Code	
050	500 ml
100	1000 ml
200	2000 ml
<b>400</b>	<b>4000 ml</b>

2 - Vessel Material Code	
<b>SS</b>	316 Stainless Steel
HC	Hastelloy® C

3 - Mixer Code	
NS	No Mixer (port plugged)
<b>MM</b>	In-Line Magnedrive Mixer (w/Dispersimax Impeller - pg. 31)

4 - Pressure Code Requirement (unit voltage)	
<b>NS</b>	None (240 VAC)
CE	CE Mark (240 VAC)
NE	Export with CRN (240 VAC)

5 - Explosion Proof (option)	
<b>XP</b>	Explosion proof with slip-on jacket and air motor

Hastelloy® C is a registered trademark of Haynes International, Inc.

**Note** The user should be aware that the 450°F (232°C) vessel temperature rating is the maximum mean wall temperature of the vessel, as defined by the ASME B&PV Code. Many variables can affect the thermal capabilities of the vessel. These factors can include, but are not limited to, the use of insulation, whether the process is batch or continuous flow, or even a chemical process itself. These factors may have bearing on heat up rate, maximum process temperature, and the cool down rate of the reactor. These factors should be considered by the user when purchasing a system in order to verify that the equipment will reach desired operating temperature in a reasonable time period. Please consult Parker Autoclave Engineers if assistance is required.

## Optional Feature Kits/Spare Parts

(purchased separately but assembled as part of purchased Reactor if required)

- Soft Seat Vessel Closure Seal Kits
- Magnedrive Bearing Option Kits
- Internal Tube Kits
- Process Cooling Component Kits
- Solid or Liquid Catalyst Charging Kit
- Tool Kits (matched to vessel type)
- Flush Valve Kit

For complete description of kit contents please see pages 16-19

## Universal Reactor Controller (URC)

We recommend that our Reactors be operated using our URC-II control package. It provides an interface to control and monitor heater & process temperature, Magnedrive speed, and Pressure. See page 41 for information on ordering the URC-II controller.

## Reactor Option Kits (purchased separately):

### Soft Seat Seal Kit

This kit provides seal material alternatives for the reactor main seal.

- Mini-Reactor/Zipperclave Reactors are supplied with Fluorocarbon (SV) Seal as standard.
- Bolted Closure and EZE-Seal Reactors are supplied with a metal seal (matches vessel material).

Each kit contains 5 seals.

The user can select material options that provide better chemical/temperature compatibility and the best value.

Soft Seat Seal Kit (PH-XXXX)		
Category	Options	Description
1	Vessel Type	
	M	Mini-Reactor
	E	EZE-Seal
	Z	Zipperclave
2	Vessel Seal Size	
	S	50-300 ml
	M	500 & 1000 ml
3	Seal Material	
	SE	Ethylene Propylene - MT 300°F (149°C) <sup>1</sup>
	SK	Paraflur Ultra - MT 527°F (275°C) <sup>1</sup>
	SN	Nitrile (Buna N) - MT 250°F (121°C) <sup>1</sup>
	SS	Silicone - MT 450°F (232°C) <sup>1</sup>
	ST	PTFE Encapsulated Fluorocarbon - MT 400°F (204°C) <sup>1</sup>
SV	Fluorocarbon - (MT 450°F (232°C) <sup>1</sup>	

<sup>1</sup> MT = Maximum Temperature. Temperature limits are suggested. Actual performance will vary with chemical compatibility.

#### Example: PH-ESSE

Part Number	PH	–	E	S	SE
Example	Kit Model		1	2	3

#### Example Description:

Soft Seat Kit: Eze-Seal, Small Size made from Ethylene Propylene

### Magnedrive Bearing Kit

Each reactor Magnedrive is supplied with Purebon 658RCH bearings as standard. This kit provides bearing material alternatives for the Magnedrive.

The option kit can also be used as Spare Parts kit as bearings are considered wear items for maintenance purposes.

The kit contains 15 bearings. This provides 5 to 7 replacement sets, depending on size of pressure vessel. The user can select bearing material options that provide better wear characteristics, particulate generation, chemical/temperature compatibility and the best value.

Magnedrive Bearing Kit (PH-XXXX)		
Category	Options	Description
1	Bearing Material	
	VB	Fluoropolymer with graphite fiber <sup>2</sup>
	PB	Purebon 658RCH (spare) <sup>3</sup>
2	Vessel Material	
	SS	316 Stainless Steel
	HC	Hastelloy® C

<sup>2</sup> Fluoropolymer bearings have a maximum recommended service temperature of 500°F (260°C).

<sup>3</sup> Purebon® is a registered trademark of Morgan AM&T.

#### Example: PH-VBSS

Part Number	PH	–	VB	SS
Example	Kit Model		1	2

#### Example Description:

Bearing Kit: Bearing made from Fluoropolymer for a 316 Stainless Steel Vessel



## Internal Tube Kit

These kits provide additional internal reactor features such as Blow Pipe, Sparge Tube, or Sample Tube.

- The Blow Pipe kit provides a means to introduce gas into the reactor to blow sediment off the vessel bottom. Alternatively, it can provide a means to take a sample from the reactor bottom.
- The Sparge Tube option provides a means to introduce gas into the reaction through a multi-port ring on the tube bottom.
- The sample tube with filter replaces the standard sample tube in the reactor. It contains a filter on the tube bottom in the vessel. It designed to eliminate or reduce particulate uptake during the sample process.

These kits, if ordered at same time as Reactor Vessel will be installed automatically. The Blow Pipe and Sparge Tube will be installed in the gas inlet connection. If both are purchased, the Blow Pipe will be installed in the sample connection. The Sample Tube with filter will be installed in the sample connection.

## Charging Port Kit

This kits provides the means of introducing a solid or liquid catalyst into the reactor. The reactor comes standard with an F437FB Flat Bottom charging port that is plugged.

- The Manual Charge Valve kit is a ball valve that is piped to the charge port on the reactor after removing plug. It can be opened to introduce material (gravity or pressurized) into the reactor, then closed.
- The 20cc Charging Cartridge kit is added to the Manual Charging kit explained above and connected to the ball valve inlet. Catalyst can be added into the cartridge, then at the selected time during the reaction the valve can be opened to introduce the catalyst.

The kits will be installed on the reactor when they are purchased together.

### Internal Tube Kit (PH-XXXXXXXX)

Category	Options	Description
1	Type	
	MTB	Mini-Reactor Blow Pipe
	MTF	Mini-Reactor Sample Tube with Filter
	STB	Blow Pipe (gas inlet or replaces sample tube)
	STF	Sample Tube with Filter
	STS	Sparge Tube (gas inlet)

2	Vessel Volume	
	005	50 ml (Mini-Reactor)
	010	100 ml (Mini-Reactor)
	015	150 ml
	030	300 ml
	050	500 ml
	100	1000 ml
	200	2000 ml
	400	4000 ml

3	Vessel Material	
	SS	316 Stainless Steel
	HC	Hastelloy® C

#### Example: PH-STB015SS

Part Number	PH	—	STB	015	SS
Example	Kit Model		1	2	3

#### Example Description:

Internal Tube Kit: Blow Pipe, 150 ml made from 316 Stainless Steel

### Charging Port (PH-XXXX) (150-4000 ml)

Category	Options	Description
1	Component	
	CPM	Manual Charge Valve
	CPC	20cc Charging Cartridge

2	Vessel Material	
	SS	316 Stainless Steel
	HC	Hastelloy® C

#### Example: PH-CPMSS

Part Number	PH	—	CPM	SS
Example	Kit Model		1	2

#### Example Description:

Charging Port Kit: Manual Charge Valve made from 316 Stainless Steel

## Reactor Option Kits (purchased separately):

### Flush Valve Kit

This kit provides the means to flush/drain the contents of the reactor from the very bottom of the reactor body.

When Flush Valve is installed on the reactor and closed, it forms a smooth profile, flush with the body inside bottom surface. When open, the stem is retracted into the valve, forming a flow path to the ¼" female NPT outlet connection.

Flush Valve Kit (PH-FVXX) * 500-4000 ml only		
Category	Options	Description
1	Vessel Material	
	SS	316 Stainless Steel
	HC	Hastelloy® C

#### Example: PH-FVSS

Part Number	PH	–	FV	SS
Example	Kit Model			1

#### Example Description:

Flush Valve Kit: Flush Valve made from 316 Stainless Steel

### Cooling Components Kit

These kits provide means of manual or remote flow control of cooling fluid to the reactor internal cooling coil.

- The Manual Cooling Valve kit is a ball valve that is piped to the inlet connection on the reactor.
- The Solenoid Cooling Valve kit provides an electrically actuated shut-off valve that is piped to the inlet connection on the reactor. Solenoid Valves are available in 120 or 240 VAC.

The kits will be installed on the reactor when they are purchased together.

Cooling Components Kit (PH-XXX)		
Category	Options	Description
1	Reactor	
	M	Mini-Reactor
	S	Bolted, Eze-Seal and Zipperclave (standard)
2	Cooling Option	
	CM	Manual Cooling Valve
	C1	Solenoid Cooling Valve (120 VAC)
	C2	Solenoid Cooling Valve (240 VAC)

#### Example: PH-SCM

Part Number	PH	–	S	CM
Example	Kit Model		1	2

#### Example Description: :

Cooling Component Kit: Manual cooling Valve for standard reactor

**Tool Kits (matched to Reactor type and size)**

**Mini-Reactor/Zipperclave Reactors:**

This kit provides the means to properly torque the Magnedrive onto the reactor if it has been removed. It includes a Torque Wrench and a Crowfoot wrench adapter.

**Bolted Closure/EZE Seal Reactors:**

This kit provides the means to properly torque the screws that couple the reactor body and cover together and affect a seal. It also provides the means to properly torque the Magnedrive onto the reactor, if it has been removed.

- *150-1000 ml Bolted/ all EZE Reactor sizes*  
Includes a torque wrench, hex and correct Crowfoot wrench adapters.
- *2000-4000 ml Bolted Closure Reactors*  
Includes two torque wrenches, hex and correct Crowfoot wrench adapters.

Tool Kit (PH-XXTKXX)		
Category	Options	Description
1	Vessel Type	
	M	Mini-Reactor
	E	EZE-Seal
	Z	Zipperclave
	B	Bolted
2	Vessel Volume	
	005	50 ml (Mini-Reactor)
	010	100 ml (Mini-Reactor)
	015	150 ml
	030	300 ml
	050	500 ml
	100	1000 ml
	200	2000 ml
	400	4000 ml

**Example: PH-ZTK015**

Part Number	PH	-	Z		TK	015
Example	Kit Model		1			2

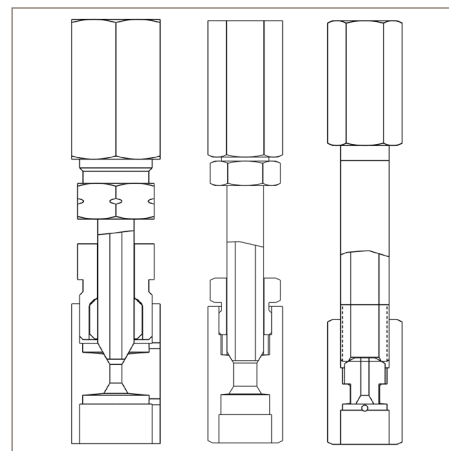
**Example Description:**

Tool Kit for a 150ml Zipperclave Reactor

# Cone Closure

## Tubular Reactors

Volume Range: 1.81 ml to 45.5 ml

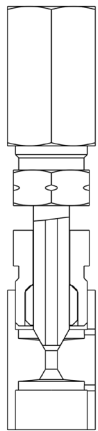


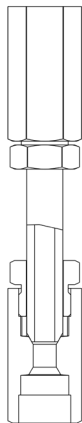
### Principle of Operation:

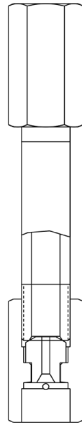
Parker Autoclave Engineers offers a series of convenient, versatile and economical tubular-reactors. Each are assembled from standard, readily available Parker Autoclave Engineers High Pressure, slimline medium pressure or custom manufactured, tubing nipples and connection components. Applicable to many low-volume laboratory reaction studies, they provide the proven reliability of Parker Autoclave Engineers coned-and-threaded connections.

### Features and Options Available:

- Type 316 SS tubing body, couplings, collars, and glands. Consult factory for other materials.
- Includes plug and gland (not shown)
- Accepts standard Parker Autoclave connection components
- Connections can be adapted to different sizes

Series CC....SS60

<b>3/16" I.D.</b>
Accepts standard 9/16" (14.3 mm) Parker Autoclave Engineers High Pressure Connection Components
Volumes: 1.81 ml to 5.43 ml Maximum Allowable Working Pressure: 60,000 psi @ 100°F 4137 bar @ 38°C
Material of Construction: 316 Stainless Steel

Series CC....SS20

<b>5/16" I.D.</b>
Accepts standard 9/16" (14.3 mm) Parker Autoclave Engineers SlimLine Connection Components
Volumes: 5.03 ml to 15.1 ml Maximum Allowable Working Pressure: 20,000 psi @ 100°F 1379 bar @ 38°C
Material of Construction: 316 Stainless Steel

Series CC....SS20

<b>7/16" I.D.</b>
Accepts standard 3/8" (9.53 mm) Parker Autoclave Engineers High Pressure Connection Components
Volumes: 9.85 ml to 45.5 ml Maximum Allowable Working Pressure: 20,000 psi @ 100°F 379 bar @ 38°C
Material of Construction: 316 Stainless Steel

## Series CC\_ \_ \_ SS60

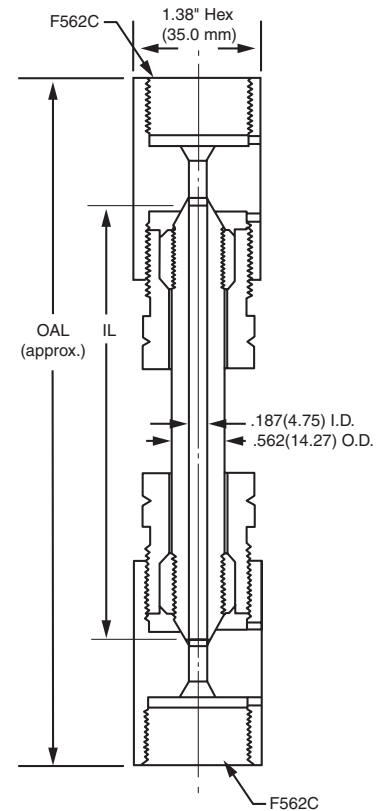
(3/16" I.D./60,000 psi/max)

### Specifications and Part Numbers:

Complete Assembly	CC.181SS60	CC.271SS60	CC.362SS60	CC.452SS60	CC.543SS60					
Drawing Number	10A-2489	10A-2489	10A-2489	10A-2489	10A-2489					
Nominal Capacity	1.81 ml	2.71 ml	3.62 ml	4.52 ml	5.43 ml					
Dimensions: inches (mm)	<b>IL</b>	<b>OAL</b>	<b>IL</b>	<b>OAL</b>	<b>IL</b>	<b>OAL</b>	<b>IL</b>	<b>OAL</b>	<b>IL</b>	<b>OAL</b>
	4.00 (102)	6.75 (171)	6.00 (152)	8.75 (222)	8.00 (203)	10.75 (273)	10.00 (254)	12.75 (324)	12.00 (305)	14.75 (375)

### Temperature and Maximum Operating Pressure:

Temperature	Maximum Operating Pressure
-20 to 100°F (-29°C to 38°C)	60,000 psi (4137 bar)
200°F (93°C)	48,850 psi (3368 bar)
400°F (204°C)	46,600 psi (3213 bar)
600°F (316°C)	43,580 psi (3005 bar)
800°F (427°C)	40,750 psi (2810 bar)



## Series CC\_ \_ \_ SS20

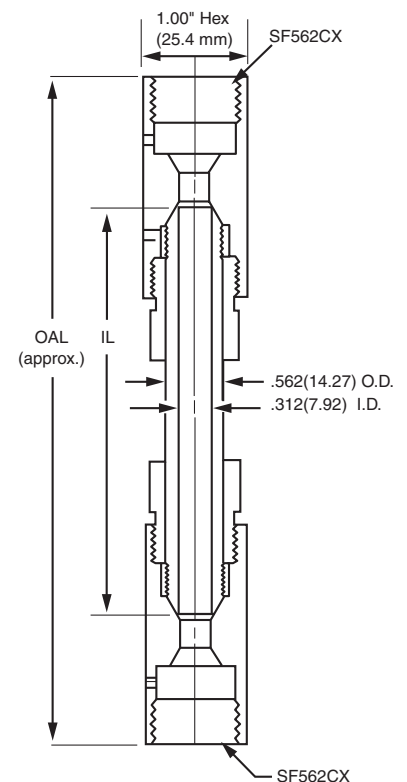
(5/16" I.D./20,000 psi/max)

### Specifications and Part Numbers:

Complete Assembly	CC.503SS20	CC.754SS20	CC1.01SS20	CC1.25SS20	CC1.51SS20					
Drawing Number	10A-2490	10A-2490	10A-2490	10A-2490	10A-2490					
Nominal Capacity	5.03 ml	7.54 ml	10.1 ml	12.5 ml	15.1 ml					
Dimensions: inches (mm)	<b>IL</b>	<b>OAL</b>	<b>IL</b>	<b>OAL</b>	<b>IL</b>	<b>OAL</b>	<b>IL</b>	<b>OAL</b>	<b>IL</b>	<b>OAL</b>
	4.00 (102)	6.50 (165)	6.00 (152)	8.50 (216)	8.00 (203)	10.50 (267)	10.00 (254)	12.50 (318)	12.00 (305)	14.50 (368)

### Temperature and Maximum Operating Pressure:

Temperature	Maximum Operating Pressure
-20 to 100°F (-29°C to 38°C)	20,000 psi (1379 bar)
200°F (93°C)	16,280 psi (1122 bar)
400°F (204°C)	15,500 psi (1069 bar)
600°F (316°C)	14,500 psi (1000 bar)
800°F (427°C)	13,580 psi (936 bar)

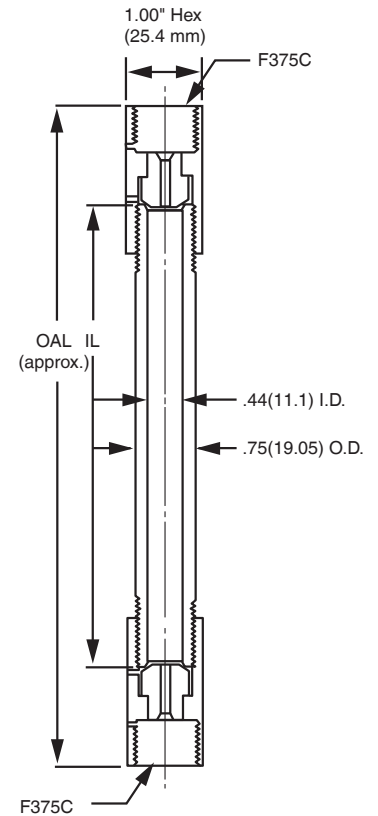


# Series CC\_ \_ \_ SS20

(7/16" I.D./20,000 psi/max)

## Specifications and Part Numbers:

Complete Assembly	CC.985SS20	CC1.96SS20	CC2.94SS20	CC3.92SS20	CC4.55SS20					
Drawing Number	10A-2447	10A-2447	10A-2447	10A-2447	10A-2447					
Nominal Capacity	9.85 ml	19.6 ml	29.4 ml	39.2 ml	45.5 ml					
Dimensions:	<b>IL</b>	<b>OAL</b>	<b>IL</b>	<b>OAL</b>	<b>IL</b>	<b>OAL</b>	<b>IL</b>	<b>OAL</b>	<b>IL</b>	<b>OAL</b>
inches	3.88	6.56	7.88	10.56	11.88	14.56	15.88	18.56	18.38	21.06
(mm)	(99)	(166)	(200)	(268)	(302)	(370)	(403)	(471)	(467)	(535)



## Temperature and Maximum Operating Pressure:

Temperature	Maximum Operating Pressure
-20 to 100°F (-29°C to 38°C)	20,000 psi (1379 bar)
200°F (93°C)	16,280 psi (1122 bar)
400°F (204°C)	15,500 psi (1069 bar)
600°F (316°C)	14,500 psi (1000 bar)
800°F (427°C)	13,580 psi (936 bar)

## Ordering Guide:

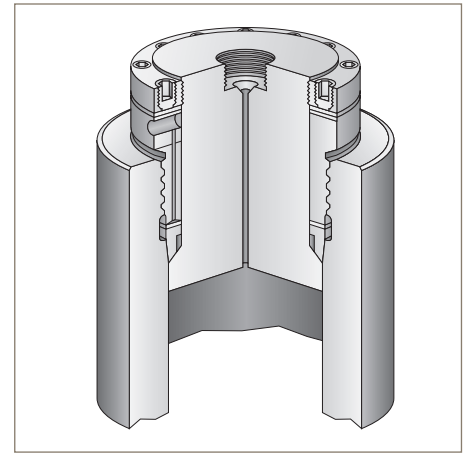
Typical catalog number example: **CC.503SS20** (catalog number is created based on customer selection of product parameters, see below for example)

CC	.503	SS	20	
Vessel Type	Capacity in ml x 10	Material	Pressure psi (bar)	
CC = Cone Closure	<p>60 kpsi 3/16" I.D.</p> <p>20 kpsi 5/16" I.D.</p> <p>20 kpsi 7/16" I.D.</p>	<p>.181 = 1.81 ml</p> <p>.271 = 2.71 ml</p> <p>.362 = 3.62 ml</p> <p>.452 = 4.52 ml</p> <p>.543 = 5.43 ml</p> <p>.503 = 5.03 ml</p> <p>.754 = 7.54 ml</p> <p>1.01 = 10.1 ml</p> <p>1.25 = 12.5 ml</p> <p>1.51 = 15.1 ml</p> <p>.985 = 9.85 ml</p> <p>1.96 = 19.6 ml</p> <p>2.94 = 29.4 ml</p> <p>3.92 = 39.2 ml</p> <p>4.55 = 45.5 ml</p>	<p>SS = 316 Stainless Steel</p> <p>XX = Consult factory, other materials available</p>	<p>20 = 20,000 (1379)</p> <p>60 = 60,000 (4137)</p>

# AE Closure

## Pressure Vessels

Volumes: 100ml to 2000ml  
 Maximum Allowable: 10,500 to 30,000 psi @ 100°F  
 Working Pressure: (724 to 2070 bar @ 37.8°C)  
 Material of Construction: 316 Stainless Steel, Alloy Steel, A-286



### Principle of Operation:

The “AE” self-sealing (modified Bridgman) pressure vessel utilizes the Bridgman Principle of “unsupported area.” The AE closure significantly improves the original Bridgman concept by utilizing an all-metal seal configuration. This not only permits very high temperatures, but also facilitates quick opening and closing of the vessel.

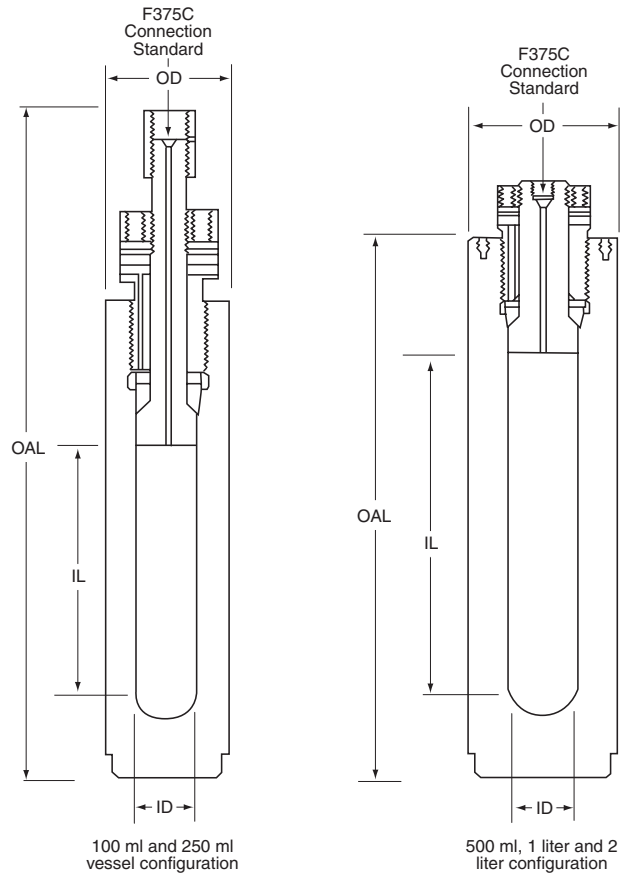
It works by harnessing the internal vessel pressure to reinforce the seal; the higher the pressure (within rated limits), the tighter the seal.

### Features and Options:

- ASME Code stamp, CRN registration, PED
- Consult factory to discuss special requirements
- Valves, Fittings and Tubing (see Autoclave.com)

### Specifications and Part Numbers:

Model Drawing #	Nominal Capacity	Dimensions: inches (mm)			
		ID	OD	IL	OAL
AE 0010 30-2555	100 ml	1.25 (32)	2.50 (64)	5.00 (127)	13.75 (349)
AE 0025 30-2556	250 ml	1.25 (32)	2.50 (64)	12.54 (319)	21.30 (541)
AE 0050 30-2523	500 ml	2.00 (51)	4.00 (102)	10.00 (254)	18.20 (462)
AE 0100 30-2524	1000 ml	3.00 (76)	6.00 (152)	9.00 (229)	20.00 (508)
AE 0200 30-2525	2000 ml	3.00 (76)	6.00 (152)	18.00 (457)	29.00 (737)



## Maximum Allowable Working Pressure (Design Pressure) vs. Temperature Rating:

Material (Body, Cover and Seal Ring)	Size	Order # Suffix	°F (°C)	-20 to -100° (-29 to 37.8°)	150° (66°)	200° (93°)	250° (121°)	300° (149°)	350° (177°)	400° (204°)	450° (232°)	500° (260°)	550° (288°)	600° (316°)
Type 316 SS	100 ml 250 ml 500 ml	Add SS 11	psi (bar)	11,000 (758)	11,000 (758)	10,950 (755)	10,900 (752)	10,850 (748)	10,750 (741)	10,650 (734)	10,600 (731)	10,500 (724)	10,250 (707)	10,000 (689)
	1000 ml 2000 ml	Add SS 10	psi (bar)	10,500 (724)	10,500 (724)	10,500 (724)	10,450 (721)	10,300 (710)	10,250 (707)	10,050 (693)	10,025 (691)	10,000 (689)	10,000 (689)	10,000 (689)
A-286	All Sizes	Add AS 29	psi (bar)	28,800 (1986)	28,500 (1966)	28,450 (1962)	28,200 (1945)	27,850 (1921)	27,350 (1886)	26,500 (1828)	25,700 (1772)	25,200 (1738)	24,700 (1703)	24,350 (1679)
Alloy Steel	All Sizes	Add SL 30	psi (bar)	30,000 (2069)	30,000 (2069)	30,000 (2069)	30,000 (2069)	30,000 (2069)	30,000 (2069)	30,000 (2069)	30,000 (2069)	30,000 (2069)	30,000 (2069)	30,000 (2069)

Material (Body, Cover and Seal Ring)	Size	Order # Suffix	°F (°C)	650° (343°)	700° (371°)	750° (399°)	800° (427°)	850° (454°)	900° (482°)	950° (204°)	1000° (538°)	1050° (566°)	1100° (593°)	1150° (621°)	1200° (649°)
Type 316 SS	100 ml 250 ml 500 ml	Add SS 11	psi (bar)	9,650 (665)	9,500 (655)	9,400 (648)	9,300 (641)	9,250 (638)	9,200 (634)	9,000* (621)	8,850* (610)	8,450* (583)	7,800* (538)	6,800* (469)	4,400* (303)
	1000 ml 2000 ml	Add SS 10	psi (bar)	9,650 (665)	9,500 (655)	9,400 (648)	9,300 (641)	9,250 (638)	9,200 (634)	9,000* (621)	8,850* (610)	8,450* (583)	7,800* (538)	6,800* (469)	4,400* (303)
A-286	All Sizes	Add AS 29	psi (bar)	24,000 (1655)	23,800 (1641)	23,650 (1631)	23,300 (1607)	23,000 (1586)	22,600 (1559)	22,000 (1517)	21,650 (1493)	21,150 (1459)	20,750 (1431)	20,000 (1379)	19,400 (1338)
Alloy Steel	All Sizes	Add SL 30	psi (bar)	30,000 (2069)	30,000 (2069)	23,650 (1631)	22,800 (1572)	21,500 (1483)	20,000 (1379)	Alloy Steel maximum 900°F (482°C)					

Maximum Recommended Operating Pressure (MROP) varies based on gauge, transducer, and rupture disk selection.

\* For operation above 900°F (482°C), A-286 Main Nut must be used.

## Ordering Guide:

Typical catalog number example: **AE0010SS11** (catalog number is created based on customer selection of product parameters, see below for example)

<b>AE</b>	<b>0010</b>	<b>SS</b>	<b>11</b>
<b>Vessel Type</b>	<b>Capacity in ml</b>	<b>Material</b>	<b>Pressure - psi (bar)</b>
<b>AE</b> = AE Vessel	<b>0010</b> = 100ml <b>0025</b> = 250ml <b>0050</b> = 500ml <b>0100</b> = 1000ml <b>0200</b> = 2000ml	<b>SS</b> = 316 Stainless Steel <b>AS</b> = A-286 Stainless Steel <b>SL</b> = Alloy Steel (SA723)	<b>10</b> = 10,500 (724) <b>11</b> = 11,000 (758) <b>29</b> = 28,800 (1986) <b>30</b> = 30,000 (2069)



# O-ring Closure

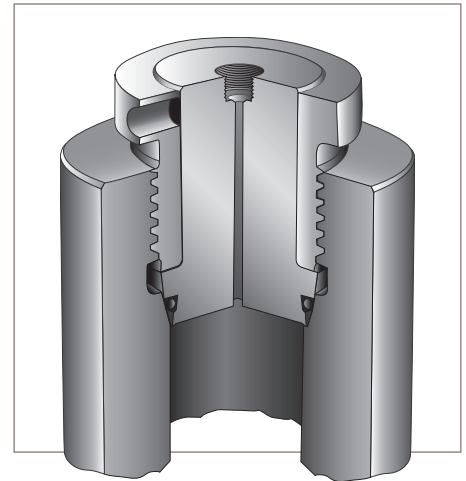
## Pressure Vessel

**Volume:** 100 ml to 2000 ml

**Vessel MAWP\*:** 10,500 to 60,000 psi @ 72°F (724 to 4137 bar @ 22°C)

**Material of Construction:** 316 Stainless Steel, Alloy Steel, A-286

\* Maximum Allowable Working Pressure



### Principle of Operation:

Parker Autoclave Engineers O-ring closure pressure vessels model OR, and O-ring closure compression cylinders, model OC and OD, offer a simple, reliable and economical alternative to the Parker Autoclave Engineers self-sealing closure where high temperature operation is not required. Standard O-ring material is Nitrile; however, optional O-ring materials are available on special order.

The main nut screws into the vessel body until it tightens the cover against the angle in the body, as shown in the figure. The groove in the cover is sized to put the proper compression on the O-ring to create a seal. The metal-to-metal contact between the cover and body prevents O-ring extrusion.

### MAWP (Design Pressure) vs. Temperature Rating for O-ring Models

Material * (Body, Cover, Seat Ring)	Nominal Capacity	Order Number Suffix	°F	-20 to 100°	150°	200°	250°	300°	350°	400°	450°	500°
			°C	-29 to 37.8°	66°	93°	121°	149°	177°	204°	232°	260°
Type 316 SS	100 ml 250 ml 500 ml	Add SS 11	psi (bar)	11,000 (758)	11,000 (758)	10,950 (755)	10,900 (752)	10,850 (748)	10,750 (741)	10,650 (734)	10,600 (731)	10,500 (724)
	1000 ml 2000 ml	Add SS 10	psi (bar)	10,500 (724)	10,500 (724)	10,500 (724)	10,450 (721)	10,300 (710)	10,250 (707)	10,050 (693)	10,025 (691)	10,000 (689)
A-286	All Sizes	Add AS 29	psi (bar)	28,800 (1986)	28,500 (1965)	28,450 (1962)	28,200 (1945)	27,850 (1920)	27,350 (1886)	26,500 (1827)	25,700 (1772)	25,200 (1738)
Alloy Steel (SA-723)	All Sizes	Add SL 30	psi (bar)	30,000 (2068)	30,000 (2068)	30,000 (2068)	30,000 (2068)	30,000 (2068)	30,000 (2068)	30,000 (2068)	30,000 (2068)	30,000 (2068)

Maximum Recommended Operating Pressure (MROP) varies based on gauge, transducer, and rupture disk selection.

## Specifications and Part Numbers

Drawing Number	Model	Nominal Capacity	Dimensions: Inches (mm)			
			ID	OD	IL	OAL
30-2557	OR0010SS11 OR0010AS29 OR0010SL30	100 ml	1.25 (32)	2.50 (64)	5.50 (140)	12.75 (324)
30-2558	OR0025SS11 OR0025AS29 OR0025SL30	250 ml	1.25 (32)	2.50 (64)	13.00 (330)	20.25 (514)
30-2528	OR0050SS11 OR0050AS29 OR0050SL30	500ml	2.00 (51)	4.00 (102)	10.87 (276)	17.25 (438)
30B-1829	OR0100SS10 OR0100AS29 OR0100SL30	1000 ml	3.00 (76)	6.00 (152)	9.65 (245)	19.80 (503)
30B-1830	OR0200SS10 OR0200AS29 OR0200SL30	2000 ml	3.00 (76)	6.00 (152)	18.72 (476)	28.80 (732)

## O-ring Closure Compression Cylinders

Models OC and OD O-ring closure compression cylinders are available as single-ended or double-ended vessels. Double-ended vessels allow for easier cleaning. All models have an F375C AE High Pressure Cone & Thread tubing connection at both ends plus four 3/8"-24 tapped holes for eye bolts and mounting. Standard material of construction is alloy steel. Refer to the model code chart for information on pressure ratings. Other materials of construction and volumes are available on special order.

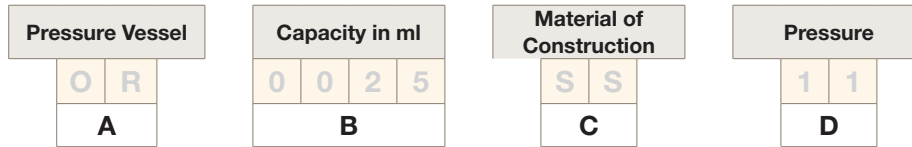
## Specifications and Part Numbers

Drawing Number	Model	Nominal Capacity	Dimensions: Inches (mm)			
			ID	OD	IL	OAL
20-9006	OC0100SL15	1000 ml	3.00 (76)	4.94 (125)	9.00 (229)	17.69 (449)
20-9007	OC0100SL30	1000 ml	3.00 (76)	6.00 (152)	9.75 (248)	18.94 (481)
20-9008	OC0100SL60	1000 ml	2.00 (51)	6.00 (152)	19.50 (495)	28.00 (711)
20-9009	OD0200SL15	2000 ml	3.00 (76)	4.94 (125)	18.00 (457)	28.50 (724)
20-9010	OD0200SL30	2000 ml	3.00 (76)	6.00 (152)	18.00 (457)	28.50 (724)
20-9011	OD0200SL60	2000 ml	2.00 (51)	6.00 (152)	39.00 (991)	49.00 (1245)

## Optional O-Ring Chart:

Material	Max. Temperature	
	° F	° C
Nitrile	250°	(121°)
EPR	300°	(149°)
Silicone	400°	(204°)
FKM	450°	(232°)
PTFE Encapsulated FKM	400°	(204°)
FFKM	500°	(260°)

## Ordering Guide:



Part Number Example: **OR0025SS11** (example selections indicated in yellow below)

A - Pressure Vessel	
<b>OR</b>	O-Ring Vessel
<b>OC</b>	O-Ring Compression, Cylinder Single Ended
<b>OD</b>	O-Ring Closure Compression Cylinder, Double Ended

B - Capacity	
<b>0010</b>	100 ml
<b>0025</b>	250 ml
<b>0050</b>	500 ml
<b>0100</b>	1000 ml
<b>0200</b>	2000 ml

C - Material of Construction	
<b>SS</b>	316 Stainless Steel
<b>AS</b>	A-286 Stainless Steel
<b>SL</b>	Alloy Steel (SA-723)

D - Pressure: psi (bar)	
<b>10</b>	10,500 (724)
<b>11</b>	11,000 (758)
<b>15</b>	15,000 (1034)
<b>29</b>	28,800 (1986)
<b>30</b>	30,000 (2069)
<b>60</b>	60,000 (4137) (OC & OD models only)

## Features and Available Options:

- ASME Code Stamp, CRN Registration available (consult factory)
- Consult factory to discuss your specific requirements

# Kuentzel Closure

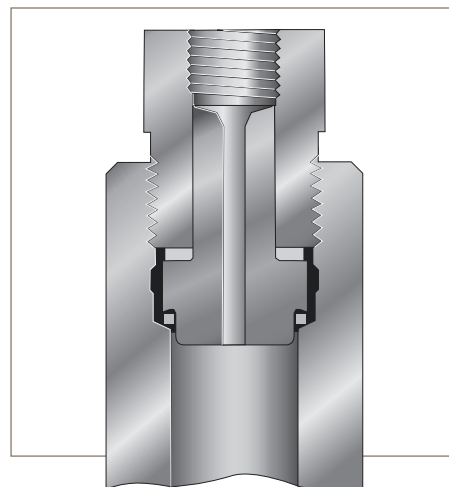
## Pressure Vessel

**Volume:** 103 ml to 206 ml

**Vessel MAWP\*:** 11,000 psi @ 100°F (758.4 bar @ 38°C)

**Material of Construction:** 316 Stainless Steel

\* Maximum Allowable Working Pressure



### Principle of Operation:

Parker Autoclave Engineers' Kuentzel closure pressure vessel is a reliable and cost efficient reactor in smaller capacity applications requiring elevated pressure operation at higher temperatures.

The four-piece Kuentzel closure design is relatively simple and easy to clean and make up. Metal-to-metal sealing is achieved with 300 series stainless steel or copper gasket, (please specify). Kuentzel vessels are offered in both single and double-ended configuration, the latter providing greater ease of cleaning.

### MAWP (Design Pressure) vs. Temperature

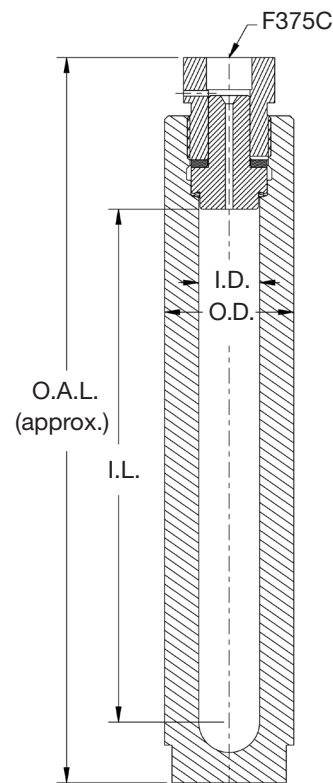
Temperature	°F (°C)	-20 to 100° (-29° to 38°)	200° (93°)	400° (204°)	600° (316°)	800° (427°)	1000° (538°)	1100° (593°)	1200° (649°)
Pressure	PSI (bar)	11,000 (758)	10,600 (730)	9,600 (661)	9,500 (655)	9,000 (620)	8,200 (565)	5,800 (399)	3,600 (248)

- Maximum Recommended Operating Pressure (MROP) varies based on gauge, transducer, and rupture disk selection.
- A286 Thrust Ring used above 800°F (427°C)
- Recommended Main Nut torque = 90 ft-lbs
- Maximum Main Nut torque = 120 ft-lbs

### Single Ended Series KC

Model Part Number	Nominal Capacity	Dimensions: Inches (mm)				Drawing
		ID	OD	IL	OAL	
KC10.3SS11 Single Ended	103 ml	1.00" (25)	2.13" (54)	8.45" (214)	12.00" (304)	20C-2763
KC20.6SS11 Single Ended	206 ml	1.00" (25)	2.13" (54)	16.45" (417)	20.00" (508)	

Series KC Single Ended units can be ordered with inside lengths from 17" to 24" (432 to 610)



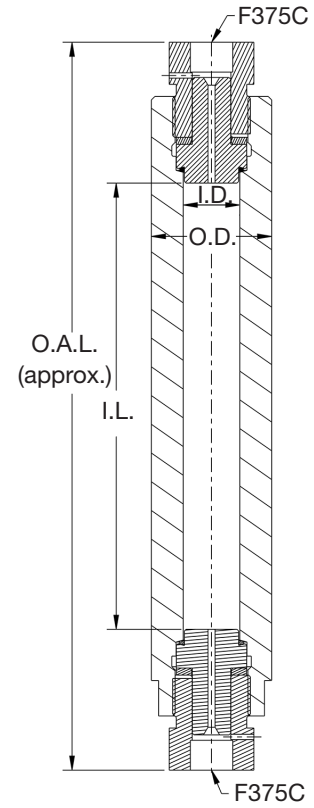
## Double Ended Series KD

Model Part Number	Nominal Capacity	Dimensions: Inches (mm)				Drawing
		ID	OD	IL	OAL	
KD10.3SS11 Double Ended	103 ml	1.00" (25)	2.13" (54)	7.92" (201)	13.00" (330)	20C-2764
KD19.3SS11 Double Ended	193 ml	1.00" (25)	2.13" (54)	14.92" (378)	20.00" (508)	
KD20.6SS11 Double Ended	206 ml	1.00" (25)	2.13" (54)	15.92" (404)	21.00" (533)	

Series KD Double Ended units can be ordered with inside lengths from 17" to 30" (432 to 762)

### Features and Available Options:

- ASME Code Stamp, CRN Registration, PED
- Consult factory to discuss your specific requirements



# i2MAG075 Inline

MagneDrive® II Series



## General Specifications:

Minimum Static Torque:
10 inch-lbs. (1.23 N-mm)
Material of Construction:
316 Stainless Steel
Maximum Recommended Operating Pressure: (MROP)
6,000 psi @ 850°F (413 bar @ 454°C)

## Ordering Information:

Part Number Example	i2MAG075	SS	BP	033
Category		1	2	3

Example: i2MAG075SSBP033

### Description:

i2MAG075, 316 Stainless Steel, Purebon 658RCH Bearings, 1/3 HP General Purpose Motor

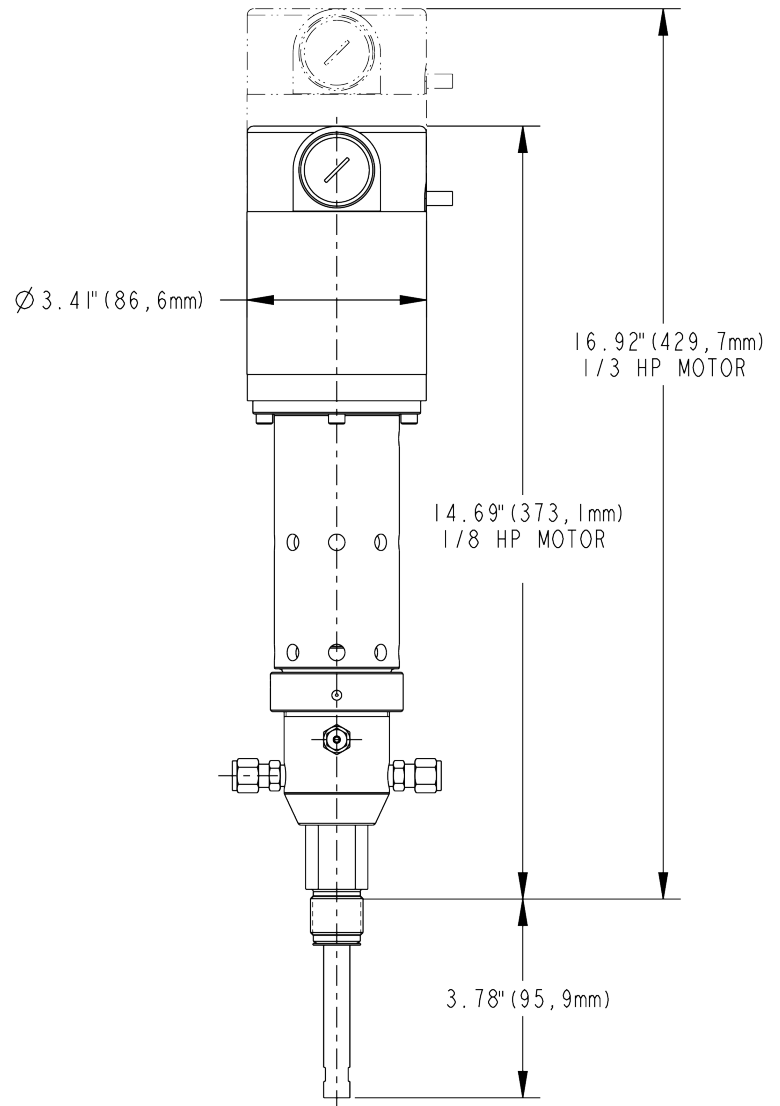
1 - Material	
SS	316 Stainless Steel
HC	Hastelloy® C
1 - Bearings	
BP	Purebon 658RCH <sup>1</sup>
BV	Fluoropolymer with Graphite Fiber <sup>2</sup>
2 - Motor	
012	1/8 HP General Purpose Motor
033	1/3 HP General Purpose Motor

<sup>1</sup> Purebon® is a registered trademark of Morgan AM&T.

<sup>2</sup> Fluoropolymer bearings have a maximum recommended service temperature of 500°F (260°C).

Hastelloy® C is a registered trademark of Haynes International, Inc.

## Tool Kit: PH-MTK



# Agitator Impellers

Providing Tools for Research and Industry

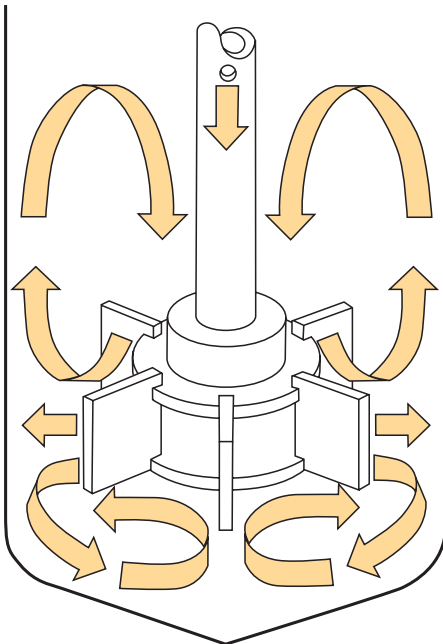


Parker Autoclave Engineers first introduced the Dispersimax™ Turbine to the research industry in 1955, followed in 1958 by the MagneDrive® for contamination-free, packless agitation. Since then, several other impeller designs have been developed to satisfy specific industry needs.

## At a Glance:

- Several Standard Designs
- Materials to Match the Vessel
- Suitable for Gas, Liquid, and Supported Solids
- Wide Range of Viscosity and Speed

## Dispersimax™ Turbine

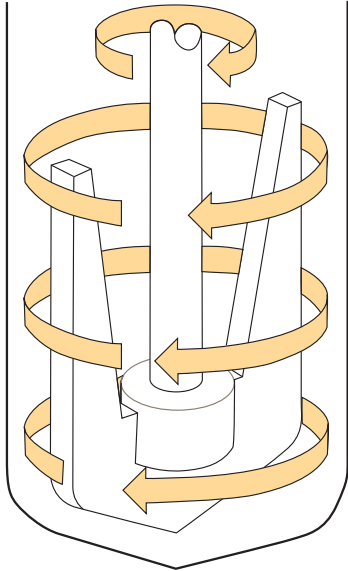


Parker Autoclave Engineers' patented Dispersimax™ Turbine type impeller is well suited for gas/liquid reactions. It provides high speed radial flow stirring, while drawing head space gas down a hollow shaft and dispersing the gas through the impeller ports, for effective entrainment of the gas into the liquid. This is generally for low viscosity applications.\*

**\*Vessel baffling is required for optimum performance.**

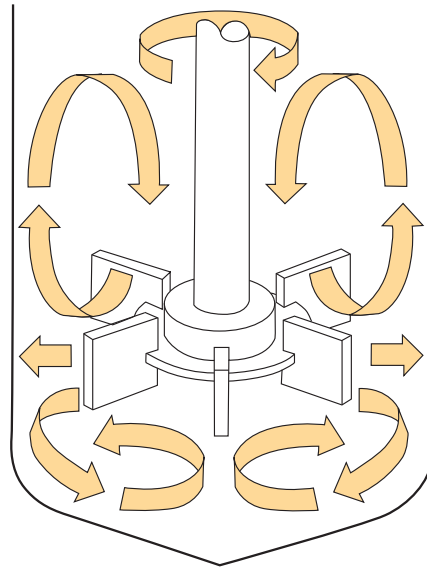


## Anchor Impeller



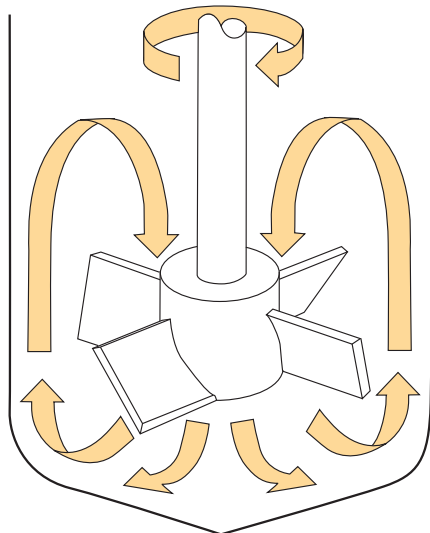
Best suited for high viscosity fluids (5,000-50,000 cp). This impeller provides radial flow and improved heat transfer at relatively low speeds. It generally provides minimal radial clearance between it and the vessel wall.

## Straight Blade Turbine



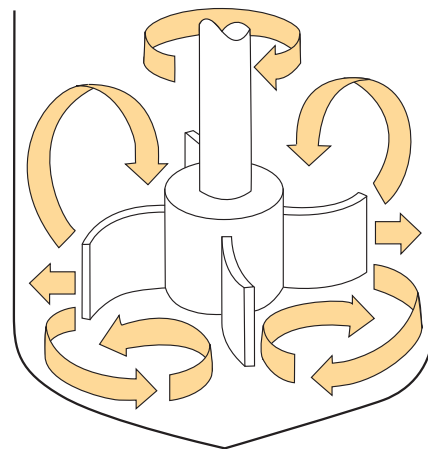
Formerly known as the “Rushton Turbine”, this impeller, like the “AE Dispersimax™ Turbine”, is suited for gas/liquid applications requiring fairly high shear at high speeds.\* The impeller also promotes radial fluid flow. \***Vessel baffling may be required for optimum performance.**

## Pitched Blade Turbine



Sometimes termed an “axial flow impeller”, the Pitched Blade Turbine is especially suited for high speed liquid/solid applications where tank baffles may be impractical. Direction of fluid flow can be up or down depending on the pitch.

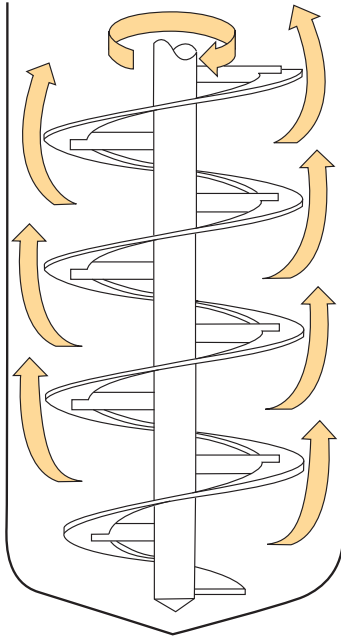
## Curved Blade Turbine



Often referred to as a “backswept turbine”, this impeller can be used in very viscous mixtures where power consumption can be of concern or in liquid/friable solid applications.\* It provides reduced shear and a radial flow pattern.\***Vessel baffling may be required for optimum performance.**

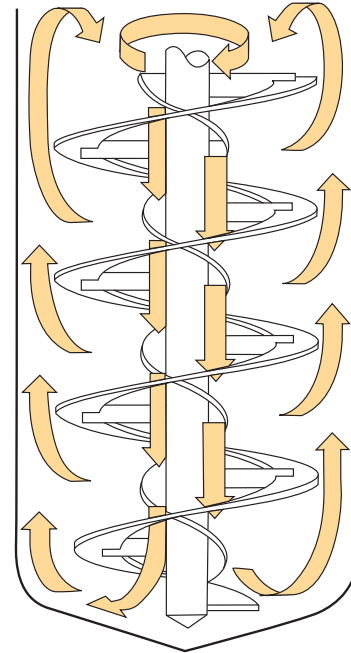


### Helical Impeller



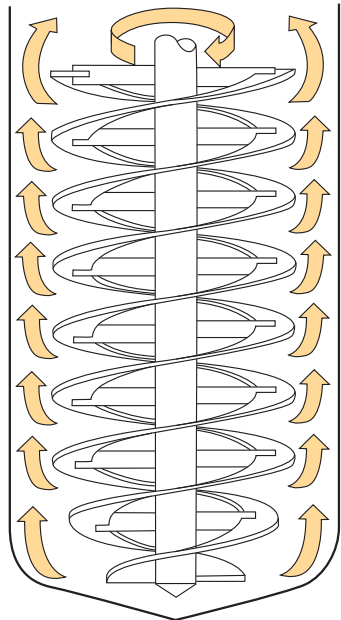
(1 Outer Flight)

### Helical Impeller



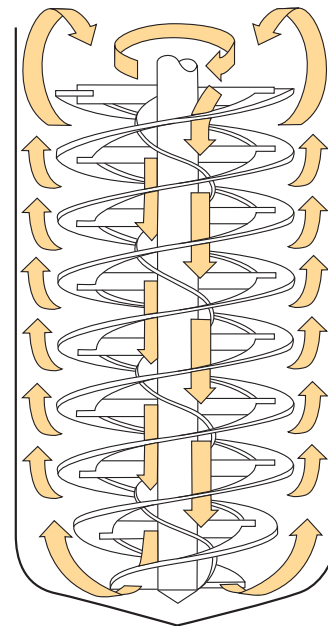
(1 Inner Flight, 1 Outer Flight)

### Helical Impeller



(2 Outer Flights)

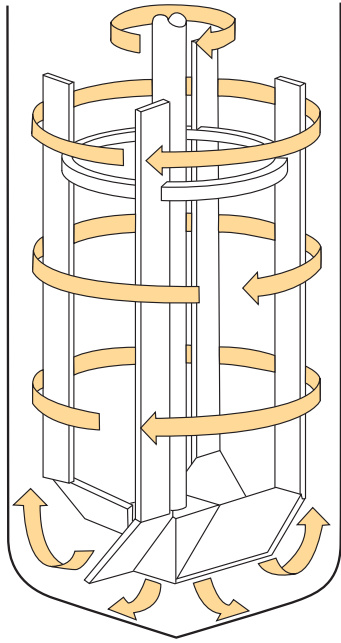
### Helical Impeller



(1 Inner Flight , 2 Outer Flights )

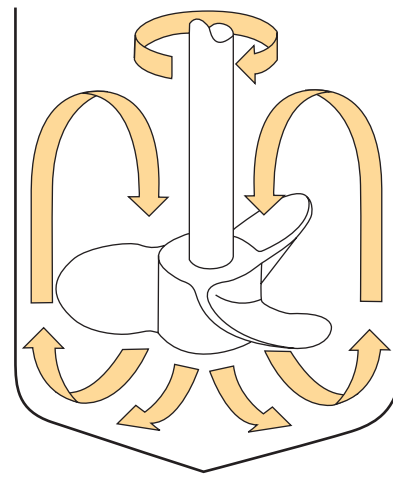
Helical impellers are used primarily in applications involving very viscous materials. They operate with minimal clearance at the vessel wall and provide axial flow at low speed. Their construction can be single or double outer flight with or without an inner flight. The outer flight provides upward pumping action while the inner flight pumps in the downward direction. (The inner flight does not add to impeller performance in the case of Newtonian fluids.) These impellers, like the Anchor, provide improved heat transfer in a viscous fluid system.

## Elongated Paddle



The Elongated Paddle impeller provides a combination of axial upward and radial fluid flow. It, like the Anchor and Helical Impellers, operates in close proximity to the vessel wall.

## Marine Propeller



The Marine Propeller is an axial flow impeller generally pitched for downward pumping action, however, upward pumping is also available. This impeller provides a high, uniform discharge and therefore is best suited for low viscosity liquid blending applications.

**\*Vessel baffling may be required for optimum performance.**

## Optional Mixing Impeller Ordering:

Part Number Example	PH-SIM	—	030	—	SS
	Impeller Kit Model Number		(VV) 1		(VM) 2

Example: PH-SIM-400-SS

Description: Marine Propeller for a 300 ml vessel built with 316 Stainless Steel

1 - Vessel Volume Code (VV)	
150-300 ml	
015	150 ml
030	300 ml
500-2000 ml	
050	500 ml
100	1000 ml
200	2000 ml

2 - Vessel Material Code (VM)	
SS	316 Stainless Steel
HC	Hastelloy® C

Reference Ordering Information Table:

(VV) = Vessel Volume code | (VM) = Vessel Material code

## Impeller Catalog Code Matrix

### Mini-Reactor Impeller Kits

PH-MIT-(VM)	Turbine Straight Blade Impeller
PH-MID-(VM)	Pitched Blade Axial Down Impeller
PH-MIU-(VM)	Pitched Blade Axial Up Impeller
PH-MIX-(VV)-(VM)	Dispersimax

### 150-300 ml Vessels Impeller Kits

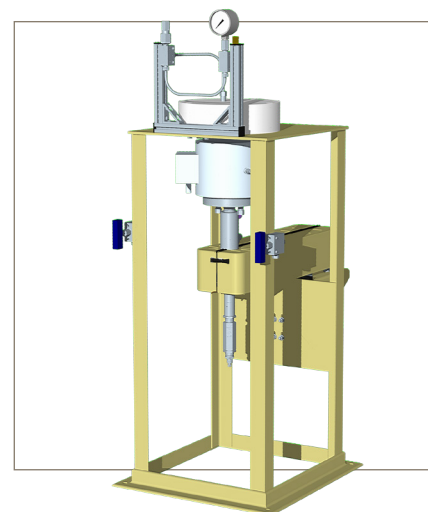
PH-SIT-(VV)-(VM)	Turbine Straight Blade Impeller
PH-SID-(VV)-(VM)	Pitched Blade Axial Down Impeller
PH-SIU-(VV)-(VM)	Pitched Blade Axial Up Impeller
PH-SIC-(VV)-(VM)	Curved Blade Impeller
PH-SIM-(VV)-(VM)	Marine Propeller
PH-SIX-(VV)-(VM)	Dispersimax

### 500-2000 ml Vessels Impeller Kits

PH-SIT-(VV)-(VM)	Turbine Straight Blade Impeller
PH-SID-(VM)	Pitched Blade Axial Down Impeller
PH-SIU-(VV)-(VM)	Pitched Blade Axial Up Impeller
PH-SIC-(VV)-(VM)	Curved Blade Impeller
PH-SIA-(VV)-(VM)	Anchor Impeller
PH-SIHA-(VV)-(VM)	Helical Impeller 1 Outer Flight
PH-SIHB-(VV)-(VM)	Helical Impeller 1 Inner & 1 Outer Flight
PH-SIHC-(VV)-(VM)	Helical Impeller 2 Outer Flights
PH-SIHD-(VV)-(VM)	Helical Impeller 1 Inner & 2 Outer Flights
PH-SIE-(VV)-(VM)	Elongated Paddle
PH-SIM-(VV)-(VM)	Marine Propeller
PH-SIX-(VV)-(VM)	Dispersimax

# Bench Top Berty Catalytic Reactor

3" and 5" Vessels



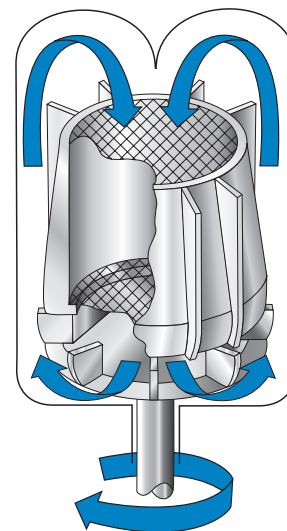
## General Specifications:

This internal recycle reactor is designed with a fixed, circular, screened catalyst bed and a bottom mounted vane type blower. Fluid circulation is directed upward along the vessel wall and deflected downward through the catalyst bed. Large diameter designs are used in applications with high pressure drop across the catalyst bed or that have very low gas density. The predictable gas/vapor circulation of the Berty design has made it the most widely used gas phase catalyst research tool.

Typical Reactions: Gas/Solid, Gas/Liquid/Solids, Liquid/Solids, Vapor/Solids

Material of Construction: 316 Stainless Steel

	3" (76.2 mm) Inside Diameter (Standard)	3" (76.2 mm) Inside Diameter (Hi-Temp)	5" (127 mm) Inside Diameter
Basket Volume (5" design includes internal spacers for three volumes)	6.1 in. <sup>3</sup> (100 cm <sup>3</sup> )	6.1 in. <sup>3</sup> (100 cm <sup>3</sup> )	9.8 in. <sup>3</sup> (160 cm <sup>3</sup> ) 18.4 in. <sup>3</sup> (303 cm <sup>3</sup> ) 31.2 in. <sup>3</sup> (511 cm <sup>3</sup> )
Free Volume	17 in. <sup>3</sup> (280 cm <sup>3</sup> )	17 in. <sup>3</sup> (280 cm <sup>3</sup> )	88.5 in. <sup>3</sup> (1,450 cm <sup>3</sup> )
Maximum Allowable Working Pressure	5,800 psig (400 Bar)	2,450 psig (169 Bar)	3,700 psig (255 Bar)
Temperature	650° F (343°C)	1,200° F (649°C)	650°F (343°C)
Maximum Blower Speed	2,500 RPM	2,500 RPM	2,500 RPM (Gas Service) 1,500 RPM (Liquid service with special impeller for liquids) 500 RPM (Liquid service using standard gas impeller)
Catalog Number Prefix	BC0010SS06AM26D	BM0010SS04AM26D	BC0043SS04AK26D



# Bench Top Carberry Catalytic Reactor

3" and 5" Vessels



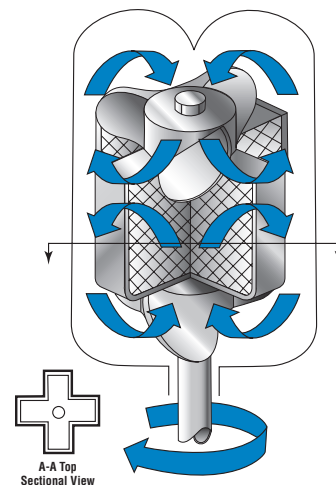
## General Specifications:

The catalyst basket has a “cruciform” cross-section. The test catalyst is placed in the cruciform basket and rotated on a shaft. Each arm of the cruciform acts as a differential reactor sweeping through the fluid reactants at high speed. Propellers are mounted above and below the cruciform to direct fluid flow.

Typical Reactions: Gas/Solid, Gas/Liquid/Solids, Liquid/Solids, Vapor/Solids

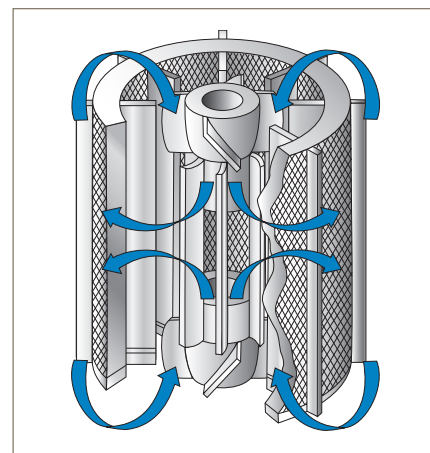
Material of Construction: 316 Stainless Steel

	3" (76.2 mm) Inside Diameter (Standard)	3" (76.2 mm) Inside Diameter (Hi-Temp)	5" (127 mm) Inside Diameter
Basket Volume	2.5 in. <sup>3</sup> (41 cm <sup>3</sup> )	2.5 in. <sup>3</sup> (41 cm <sup>3</sup> )	6.3 in. <sup>3</sup> (103 cm <sup>3</sup> )
Free Volume	18 in. <sup>3</sup> (295 cm <sup>3</sup> )	18 in. <sup>3</sup> (295 cm <sup>3</sup> )	88 in. <sup>3</sup> (1,442 cm <sup>3</sup> )
Maximum Allowable Working Pressure	5,800 psig (400 Bar)	2,450 psig (169 Bar)	3,700 psig (255 Bar)
Temperature	650°F (343°C)	1,200°F (649°C)	650°F (343°C)
Maximum Impeller/Basket Speed	2,500 RPM (gas) 1,000 RPM (liquid)	2,500 RPM (gas) 1,000 RPM (liquid)	2,500 RPM (gas) 1,000 RPM (liquid)
Catalog Number Prefix	BC0006SS06AM26D	BM0006SS04AM26D	BC0012SS04AK26D



# Robinson-Mahoney Stationary Catalytic Basket Kit

Use in 300, 500, and 1000 ml  
Eze-Seal, Bolted Closure, and Zipper-Clave



## General Specifications:

The fixed annular catalyst basket has baffles inside and outside to control vortices. The rotating shaft is equipped with two impellers that draw fluid into the center of the annulus at the top and bottom and outward through the catalyst bed. The gradient-free design and long duration circulation capability for multiple phases has made the Robinson-Mahoney the most widely used design for supported, heterogeneous catalyst research with liquids.

Typical Reactions: Liquefaction, Hydro-Treating, Catalyst Testing

Basket Screen: 14x14 mesh, 0.020" wire with nominal opening size of 0.051"

Use in Reactors: 300 ml, 500 ml, and 1000 ml (EZE-Seals, Bolted Closures, and Zipperclaves®)

Material of Construction: 316 Stainless Steel or Hastelloy C

300 ml Reactor Basket Volume: 40 cc

500 ml and 1000 ml Reactor Basket Volume: 100 cc

Basket for a 300 ml reactor part number 316 Stainless Steel: **PH-BASKET-ST-300-SS**

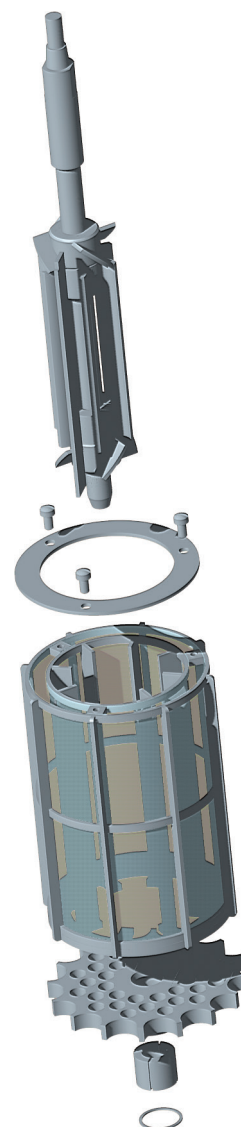
Basket for a 300 ml reactor part number Hastelloy C: **PH-BASKET-ST-300-HC**

Basket for a 500 ml reactor part number 316 Stainless Steel: **PH-BASKET-ST-500-SS**

Basket for a 500 ml reactor part number Hastelloy C: **PH-BASKET-ST-500-HC**

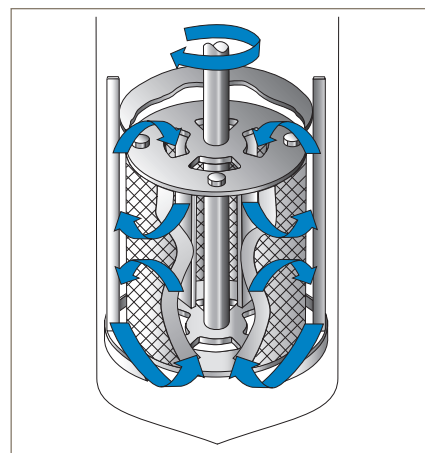
Basket for a 1000 ml reactor part number 316 Stainless Steel: **PH-BASKET-ST-1000-SS**

Basket for a 1000 ml reactor part number Hastelloy C: **PH-BASKET-ST-1000-HC**



# Mahoney-Robinson Spinning Catalytic Basket Kit

300, 500, and 1000 ml  
EZE-Seals, Bolted Closures, and Zipperclaves



## General Specifications:

The annular catalyst basket is rotated on a shaft to move the catalyst through the reactants. Baffles inside the basket and fixed baffles outside the basket direct reactant flow.

Typical Reactions: Hydrocarbon, Petroleum Studies, Hydro-Liquefaction, Catalyst Testing

Basket Screen: 14x14 mesh, 0.020" wire with nominal opening size of 0.051"

Use in Reactors: 300 ml, 500 ml, and 1000 ml (EZE-Seals, Bolted Closures, and Zipperclaves®)

Material of Construction: 316 Stainless Steel or Hastelloy C

300 ml Reactor Basket Volume: 20 cc

500 ml and 1000 ml Reactor Basket Volume: 110 cc

Basket for a 300 ml reactor part number 316 Stainless Steel: **PH-BASKET-SP-300-SS**

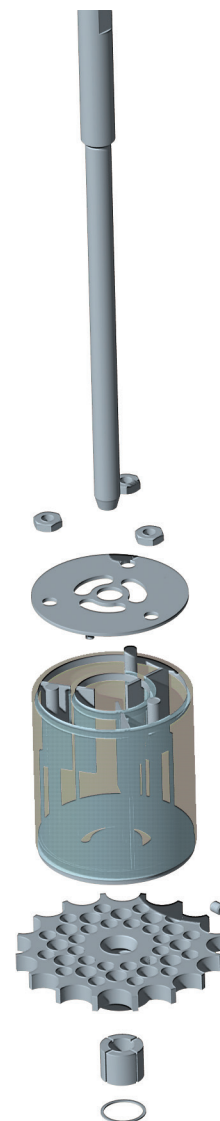
Basket for a 300 ml reactor part number Hastelloy C: **PH-BASKET-SP-300-HC**

Basket for a 500 ml reactor part number 316 Stainless Steel: **PH-BASKET-SP-500-SS**

Basket for a 500 ml reactor part number Hastelloy C: **PH-BASKET-SP-500-HC**

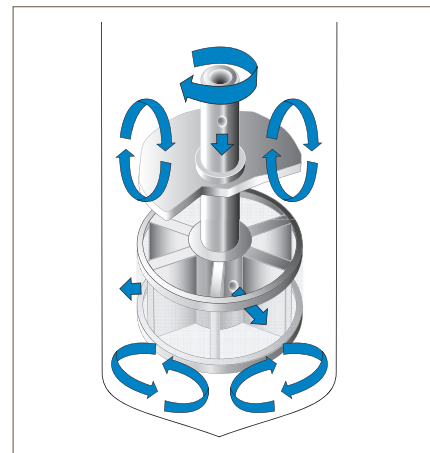
Basket for a 1000 ml reactor part number 316 Stainless Steel: **PH-BASKET-SP-1000-SS**

Basket for a 1000 ml reactor part number Hastelloy C: **PH-BASKET-SP-1000-HC**



# Dispersimax™ Mini Basket Kit

Use in 50 - 100 ml Mini-Reactor



## General Specifications:

The spinning Dispersimax™ catalyst basket impeller is designed for gas/liquid/solid (GLS) phases where the catalyst cannot be suspended or the researcher wants the catalyst in a basket. The Dispersimax™ spinning catalyst basket impeller, apart from being a catalyst basket, works exactly as a standard Dispersimax™, allowing gas to be drawn down the hollow shaft and to promote a positive flow through the hole in the impeller for dispersion. This will allow the catalyst contained to have a positive flow of gas over it, or entrained. It also offers the effect of re-circulating the gas again down the shaft.

Typical Reactions: Hydrogenation, Fischer-Tropsch, Catalyst Testing

Basket Screen: 720 X 150 mesh (18-21 microns)

Use in Reactors: 50 – 100 ml Mini-Reactor

Material of construction: 316 Stainless Steel or Hastelloy C

0.75 inch diameter basket volume: 0.08 in<sup>3</sup> (1.3 cc)

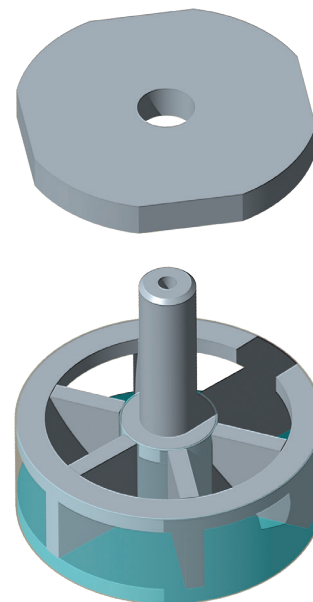
1.00 inch diameter basket volume: 0.16 in<sup>3</sup> (2.7 cc)

0.75 inch diameter basket part number 316 Stainless Steel: **PH-BASKET-DIS-075-SS**

0.75 inch diameter basket part number Hastelloy C: **PH-BASKET-DIS-075-HC**

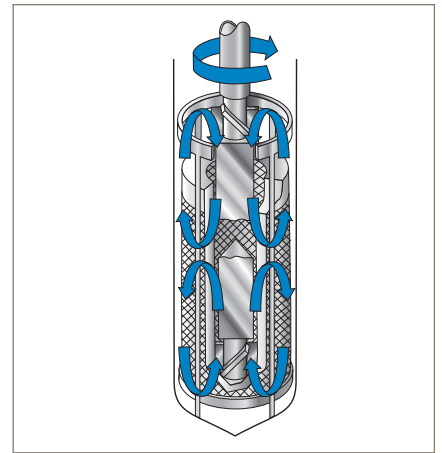
1.00 inch diameter basket part number Stainless Steel: **PH-BASKET-DIS-100-SS**

1.00 inch diameter basket part number Hastelloy C: **PH-BASKET-DIS-100-HC**



# Robinson-Mahoney Mini Catalytic Basket Kit

Use in 100 ml Mini-Reactor



## General Specifications:

The fixed annular catalyst basket has baffles inside and outside to control vortices. The rotating shaft is equipped with two impellers that draw fluid into the center of the annulus at the top and bottom and outward through the catalyst bed. The gradient-free design and a long duration circulation capability for multiple phases has made the Robinson-Mahoney the most widely used design for catalyst research with liquids.

Typical Reactions: Liquefaction, Hydro-Treating, Catalyst Testing

Basket Screen: 50x50 mesh, 0.009" wire

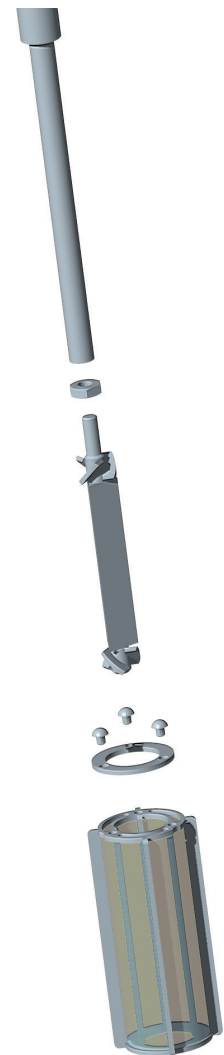
Use in Reactor: 100 ml Mini-Reactor

Material of Construction: 316 Stainless Steel

100 ml Reactor Basket Volume: 15.4 cc

Basket for a 100 ml reactor part number 316 Stainless Steel: **PH-BASKET-MINI-100-SS**

Basket for a 100 ml reactor part number Hastelloy C: **PH-BASKET-MINI-100-HC**





# URC II & URC II mini

## Universal Reactor Controller



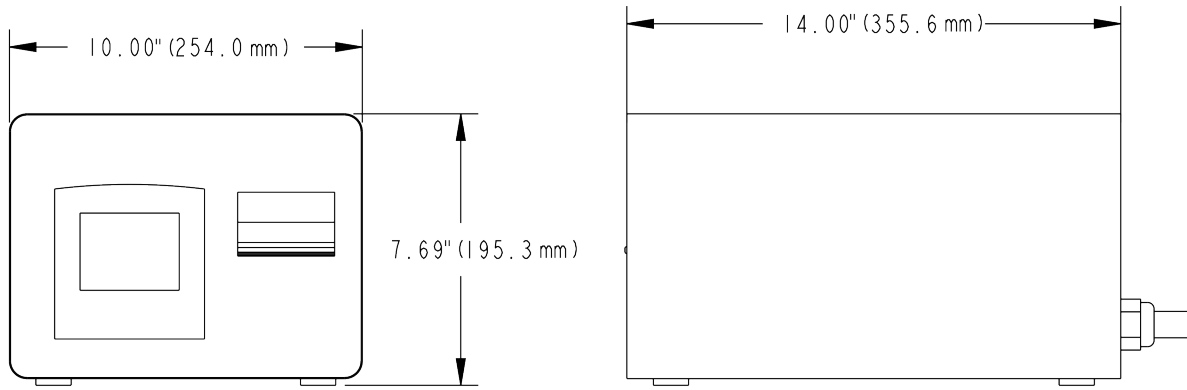
### Principle of Operation:

The URC II and URC II Mini Controllers are an integrated package utilizing a Programmable Logic Controller (PLC) for all process control, monitoring and coordination in conjunction with a touch screen operator display unit. The URC II and URC II Mini provide the operator with a concise point of control for all processes related to a reactor system. The unit controls and monitors the reactor's external and internal temperatures, the speed of the impeller, and the pressure within the reactor.

### Features and Benefits:

- Electric Heat Control
- 3-1/2" Diagonal Color Touchscreen user interface
- Two (2) Type 'K' Thermocouples degree C or degree F readout
- Non-Latching overtemp control action
- Closed Loop DC motor speed control
- Pressure Indication Range up to 689 bar (10000 psi). [Set at 0 "zero" at factory, user adjustable in the field.]
- RJ11 connector for RS232 communication
- CE marked
- UL/CUL listed
- Can be used for all Parker Autoclave units, from 50 ml to 4,000 ml volumes.

## Drawing Details:



## Ordering Information:

Product	Product Description	Part Number	Supported Vessels
URC II	240 VAC, 30 A, Single Phase	URC-II	500-4000ml
URC II Mini	120 VAC, 15 A, Single Phase	URC-II-Mini-120	300ml and below
	240 VAC, 15 A, Single Phase	URC-II-Mini-240	

# MagnePump

## Recirculation MagnePumps



Parker Autoclave Engineers MagnePumps eliminate or reduce many of the problems associated with conventional pumps, such as leakage, contamination and packing heat generation. They are ideal for applications where purity of the fluid is a major consideration or where leakage of material could be hazardous such as nuclear and petrochemical hydrates loops.

In addition, power loss is eliminated due to no seal friction, delivering full motor horsepower to the pumping unit. Also, when adverse conditions exist the magnet drive functions as a clutch, eliminating overload and motor burnout.

### 1-1/2 HP MagnePumps

The 1-1/2 horsepower MagnePumps is a packless design that provides improved efficiency and high torque with reduced heat losses. The 1-1/2 HP MagnePump is designed for liquid service and are rated for up to 5,000 psi (345 bar) system pressure.

### 7-1/2 HP MagnePumps

The 7-1/2 horsepower MagnePumps is a packless design which requires no supplemental cooling source. A built-in centrifugal air circulator cools the magnet zone. The 7-1/2 HP MagnePump is designed for liquid service and are rated for up to 4400 psi (303 bar).



### At a Glance:

	1-1/2 HP	7-1/2 HP
MAWP	5000 psi @ 650° F (345 bar @ 343°C)	4400 psi @ 600° F (303 bar @ 315°C) 2500 psi @ 600° F (172 bar @ 315°C) (Hastelloy)
Operating Speed	3450 rpm @ 60 Hz 2875 rpm @ 50 Hz 4400 rpm @ 76.5 Hz	3450 rpm @ 60 Hz 2875 rpm @ 50 Hz 4400 rpm @ 76.5 Hz
Static Torque	15 in-lbs. (1.7 N-m)	150 in-lbs. (17 N-m)

## Applications

Applications for recirculation of process fluids (not gas) for nuclear, primary & secondary coolant, petrochemical hydrates loops and other similar processes.

## Technical Specifications

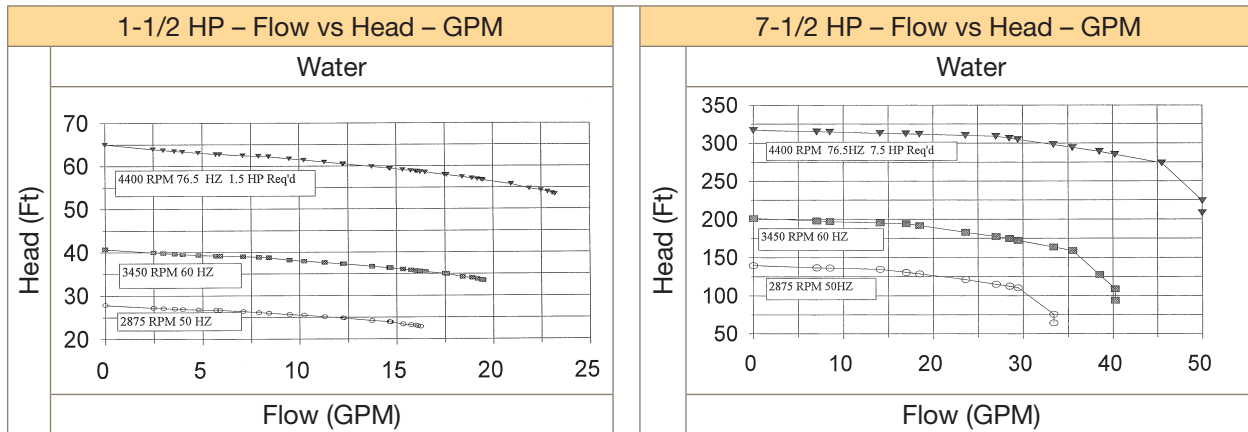
		1-1/2 HP	7-1/2 HP	
Operating Conditions	Maximum allowable working pressure	5000 psi (345 bar)	4400 psi (303 bar) 2500 psi (172 bar) - Hastelloy	
	Maximum Temperature	650°F (343°C) - Purebon® Bearings - 4400 psi model: 600°F (315°C) 550°F (288°C) Rulon® Bearings		
	Operating Speed	2875 rpm @ 50 hz, 3450 rpm @ 60 Hz, 4400 rpm @ 76.5 Hz		
	MagneDrive Static Torque	15 in - lbs. 1.7 N-m)	150 in - lbs. 17 N-m)	
	Magnet Cooling	Water cooling must be used at all times	No cooling required.	
	Pump Construction	Material	Pump wetted parts - except as noted	316 SS/Hastelloy® C276
Drive Housing			A-286 SS or Hastelloy® C276	Hastelloy® C276 Inconel 718 (4400 psi)
			Internal fasteners	300 Series SS or Hastelloy® C-276
Bearings			Purebon® bearings 658RCH or Rulon® LR	Purebon® bearings 658RCH
Port Size		Inlet	SF1000CX (1.00" OD x 0.688" ID tubing)	1-1/2" - 2500 lb. ANSI flange (1.5" ID - 2500 psi, 1.34" ID - 4400 psi)
		Outlet		1" - 2500 lb. ANSI flange (0.95" ID - 2500 psi, 0.82" ID - 4400 psi)
Motor Rating		Type	TEFC	
		Voltage	230/400 VAC, 3 Phase, 50 Hz  208-230/460 VAC, 3 Phase, 60 Hz, Variable Speed (30-76.5 Hz operating range)	230/400 VAC, 3 Phase, 50 Hz  208-230/460 VAC, 3 Phase, 60 Hz, Variable Speed (30-76.5 Hz operating range)

## General Information

	1-1/2 HP	7-1/2 HP
Mounting Position	Horizontal	Horizontal
Weight (Approximate)	154 lbs. (70 kg) (for other models see drawing)	396 lbs. (180 kg) (for other models see drawing)
Maximum Flow	See Flow Charts on page 43	
Maximum Head		

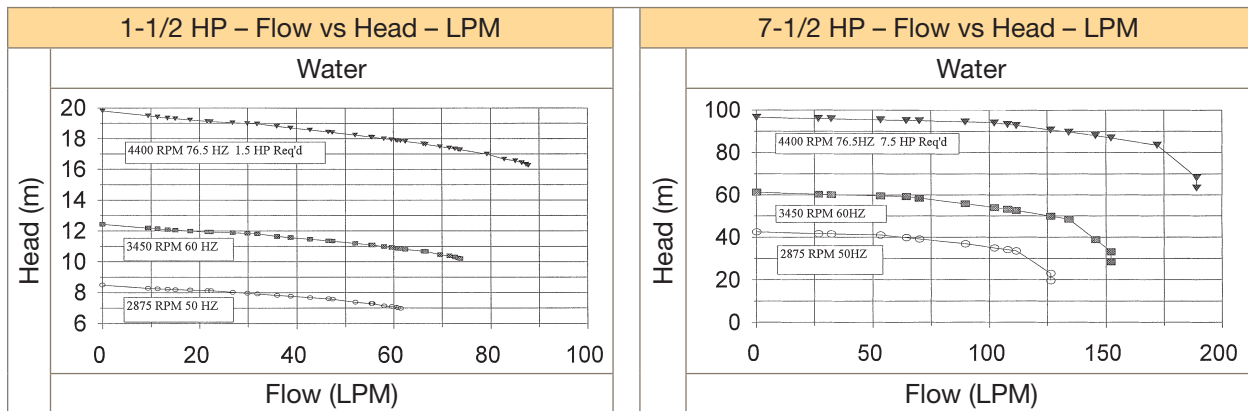
## Flow Charts:

### Flow vs. Head - GPM



Note: High and lower curves are calculated

### Flow vs. Head - LPM



Note: High and lower curves are calculated

## Ordering Guide:

PH-MP	15	60	SS
Category	1	2	3

Part Number Example: **PH-MP1560SS**

Category 1	Pump Size	
	15	1-1/2 hp
	15R	1-1/2 hp with Rulon® Bearings
	75	7-1/2 hp
Category 2	Voltage	
	50	230/400 VAC, 50 Hz, 3 Phase 30-76.5 Hz operating range
	60	208-230/460 VAC, 60 Hz, 3 Phase) 30-76.5 Hz operating
Category 3	Material	
	SS	316 SS
	HC	Hastelloy® C-276

## Accessories:

Magnepump Tool Kits	
Model Number	Description
TK-MP2040/236505	TOOL KIT FOR 1-1/2 HP PSI MAGNEPUMP
TK-MP4093/503204	TOOL KIT FOR 7-1/2 HP 4400 PSI MAGNEPUMP

Magnepump tool kits contain specialty tools needed for standard maintenance. Kits include torque wrenches, hex bit sockets, crowfoot wrench, etc.

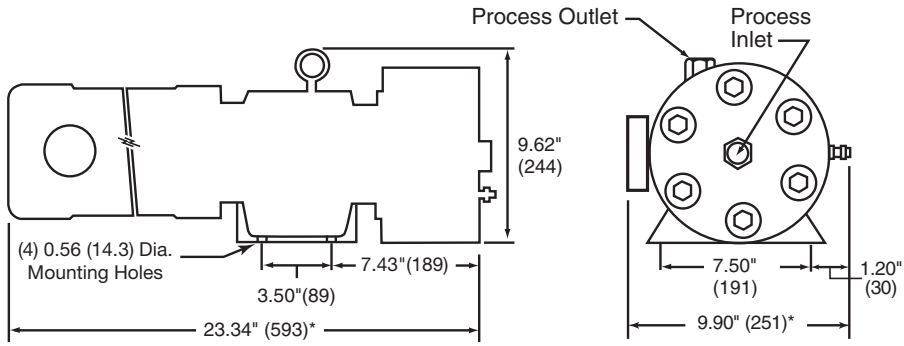
Magnepump Spare Parts Kits	
Model Number	Description
SPK-MP2040/23650555	SPARE PARTS KIT FOR 1-1/2 HP 316 SS MAGNEPUMP WITH RULON® BEARINGS
SPK-MP2040/23650565	SPARE PARTS KIT FOR 1-1/2 HP 316 SS MAGNEPUMP WITH PUREBON® BEARINGS
SPK-MP2040/23650555-H	SPARE PARTS KIT FOR 1-1/2 HP HAST C MAGNEPUMP WITH RULON® BEARINGS
SPK-MP2040/23650565-H	SPARE PARTS KIT FOR 1-1/2 HP HAST C MAGNEPUMP WITH PUREBON® BEARINGS
SPK-MP4093/50320265-H	SPARE PARTS KIT 7-1/2 HP 2500 PSI HAST C MAGNEPUMP WITH PUREBON® BEARINGS
SPK-MP4093/50320465	SPARE PARTS KIT FOR 7-1/2 HP 4400 PSI 316 SS MAGNEPUMP WITH PUREBON® BEARINGS

Magnepump spare parts kits contain parts needed for standard maintenance. Kits include internal bearings, metal seals, etc.

Purebon® is the registered trademark of Morgan AM&T  
 Rulon® is the registered trademark of Saint-Gobain Performance Plastics  
 Hastelloy® is the registered trademark of Haynes International, Inc.  
 Inconel® is the registered trademark of Huntington Alloys Corporation

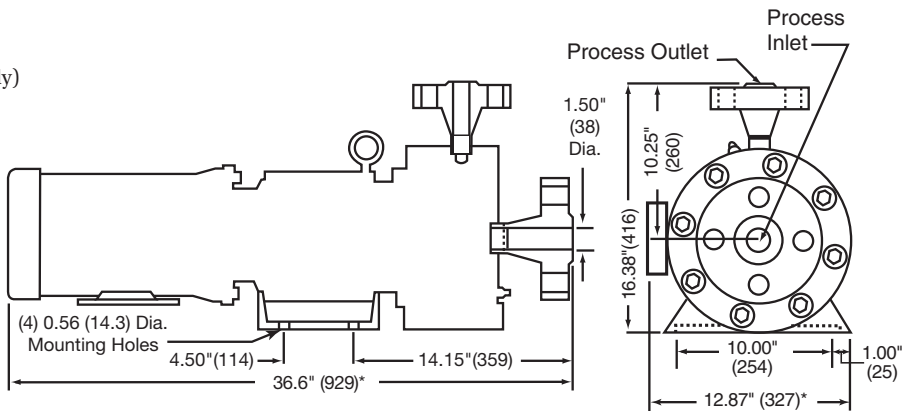
# Drawing Details

## 1-1/2 HP



## 7-1/2 HP

(2500 psi only)



All dimensions are subject to change.  
Inches (mm)

### MagnePump Drawings

Material	HP	PSIG	Bearings	Drawing #
316 SS	1-1/2	5000	Purebon®	40C-1161
			Rulon®	40C-1177
Hastelloy® C-276	7-1/2	4400	Purebon®	40A-9470
	1-1/2	5000	Purebon®	40C-1351
			Rulon®	40C-1352
	7-1/2	2500	Purebon®	40C-1398

3D CAD models are available on request

Notes:



Notes:

Notes:

# Parker's Motion & Control Technologies

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further information call 1-800-C-Parker.

MARKET	KEY MARKETS	KEY PRODUCTS
 <p><b>AEROSPACE</b></p>	<p>Aircraft Engines Commercial Commerical Transports Military Aircraft Regional Transports</p> <p>Business and General Aviation Land-Based Weapons Systems Missiles and Launch Vehicles Unmanned Aerial Vehicles</p>	<p>Flight Control Systems &amp; Components Fluid Conveyance Systems Fluid Metering Delivery &amp; Atomization Devices Fuel Systems &amp; Components</p> <p>Hydraulic Systems &amp; Components Inert Nitrogen Generating Systems Pneumatic Systems &amp; Components Wheels &amp; Brakes</p>
 <p><b>CLIMATE CONTROL</b></p>	<p>Agriculture Food, Beverage and Dairy Precision Cooling Transportation</p> <p>Air Conditioning Life Sciences &amp; Medical Processing</p>	<p>Co2 Controls Electronic Controllers Filter Driers Hand Shut-Off Valves Hose &amp; Fittings</p> <p>Pressure Regulating Valves Refrigerant Distributors Safety Relief Valves Solenoid Valves Thermostatic Expansion Valves</p>
 <p><b>ELECTRO-MECHANICAL</b></p>	<p>Aerospace Life Science &amp; Medical Packaging Machinery Plastics Machinery &amp; Converting Semiconductor &amp; Electronics Factory Automation</p> <p>Machine Tools Paper Machinery Primary Metals Textile Wire &amp; Cable</p>	<p>AC/DC Drives &amp; Systems Electric Actuators, Gantry Robots &amp; Slides Electrohydrostatic Actuation Systems Electromechanical Actuation Systems Human Machine Interface</p> <p>Linear Motors Stepper Motors, Servo Motors Drives &amp; Controls Structural Extrusions</p>
 <p><b>FILTRATION</b></p>	<p>Food &amp; Beverage Life Sciences Mobile Equipment Power Generation Transportation</p> <p>Industrial Machinery Marine Oil &amp; Gas Process</p>	<p>Analytical Gas Generators Compressed Air &amp; Gas Filters Condition Monitoring Engine Air, Fuel &amp; Oil Filtration &amp; Systems</p> <p>Hydraulic, Lubrication &amp; Coolant Filters Process, Chemical, Water Microfiltration Filters Nitrogen, Hydrogen &amp; Zero Air Generators</p>
 <p><b>FLUID and GAS HANDLING</b></p>	<p>Aerospace Agriculture Bulk Chemical Handling Construction Machinery Food &amp; Beverage Fuel &amp; Gas Delivery</p> <p>Industrial Machinery Mobile Oil &amp; Gas Transportation Welding</p>	<p>Brass Fittings &amp; Valves Diagnostic Equipment Fluid Conveyance Systems Industrial Hose</p> <p>PTFE &amp; PFA Hose, Tubing &amp; Plastic Fittings Rubber &amp; Thermoplastic Hose &amp; Couplings Tube Fittings &amp; Adapters Quick Disconnects</p>
 <p><b>HYDRAULICS</b></p>	<p>Aerospace Aerial lift Agriculture Construction Machinery Forestry</p> <p>Industrial Machinery Mining Oil &amp; Gas Power Generation &amp; Energy Truck Hydraulics</p>	<p>Diagnostic Equipment Hydraulic Cylinders &amp; Accumulators Hydraulic Motors &amp; Pumps Hydraulic Systems Hydraulic Valves &amp; Controls</p> <p>Power Take-Offs Rubber &amp; Thermoplastic Hose &amp; Couplings Tube Fittings &amp; Adapters Quick Disconnects</p>
 <p><b>PNEUMATICS</b></p>	<p>Aerospace Conveyor &amp; Material Handling Factory Automation Life Science &amp; Medical</p> <p>Machine Tools Packaging Machinery Transportation &amp; Automotive</p>	<p>Air Preparation Brass Fittings &amp; Valves Manifolds Pneumatic Accessories Pneumatic Actuators &amp; Grippers Pneumatic Valves &amp; Controls</p> <p>Quick Disconnects Rotary Actuators Rubber &amp; Thermoplastic Hose &amp; Couplings Structural Extrusions Thermoplastic Tubing &amp; Fittings Vacuum Generators, Cups &amp; Sensors</p>
 <p><b>PROCESS CONTROL</b></p>	<p>Chemical &amp; Refining Food, Beverage &amp; Dairy Medical &amp; Dental</p> <p>Microelectronics Oil &amp; Gas Power Generation</p>	<p>Analytical Sample Conditioning Products &amp; Systems Fluoropolymer Chemical Delivery Fittings, Valves &amp; Pumps High Purity Gas Delivery Fittings, &amp; Valves &amp; Regulators</p> <p>Instrumentation Fittings, Valves Regulators Medium Pressure Fittings &amp; Valves Process Control Manifolds</p>
 <p><b>SEALING and SHIELDING</b></p>	<p>Aerospace Chemical Processing Consumer Energy, Oil &amp; Gas Fluid Power General Industrial</p> <p>Information Technology Life Sciences Military Semiconductor Transportation</p>	<p>Dynamic Seals Elastomeric O-Rings Emi Shielding Extruded &amp; Precision-Cut, Fabricated Elastomeric Seals</p> <p>Homogeneous &amp; Inserted Elastomeric Shapes High Temperature Metal Seals Metal &amp; Plastic Retained Composite Seals Thermal Management</p>

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## ! CAUTION !

Do not mix or interchange component parts or tubing with those of other manufacturers. Doing so is unsafe and will void warranty.

Parker Autoclave Engineers Valves, Fittings, and Tools are not designed to interface with common commercial instrument tubing and are designed to only connect with tubing manufactured to Parker Autoclave Engineers AES specifications. Failure to do so is unsafe and will void warranty.

## WARNING

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