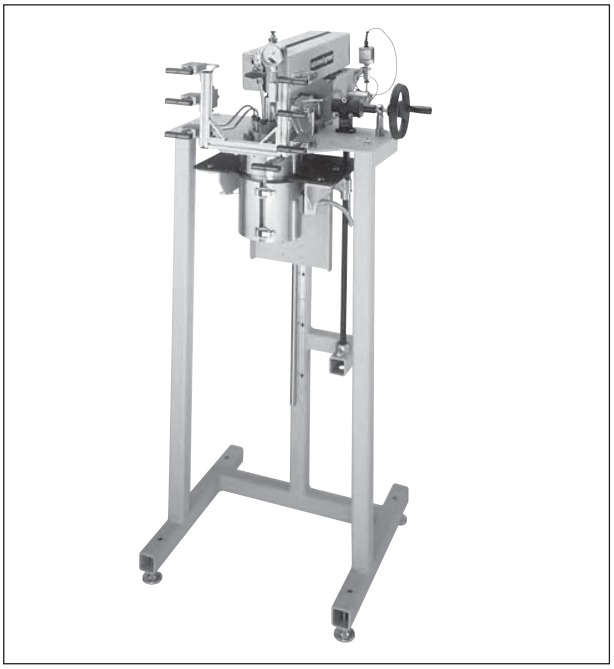
Parker Autoclave Engineers

Providing Tools for Research and Industry

2,000 and 4,000 ml EZE-Seal Stirred Reactor



At a Glance

Volume:	2,000 or 4,000 ml
Vessel MAWP:	3,300 psi @ 850° F
(Design Pressure)	(227 Bar @ 454° C)
Material of Construction:	316 Stainless Steel or Hastelloy C-276

Principle of Operation

The Parker Autoclave Engineers' EZE Seal Reactor has been designed to provide the researcher with an interchangeable 2-piece vessel design. The 2,000 ml and 4,000 ml units are identical in design except for the depth of the reactor. Conversion kits are available between the two sizes. 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

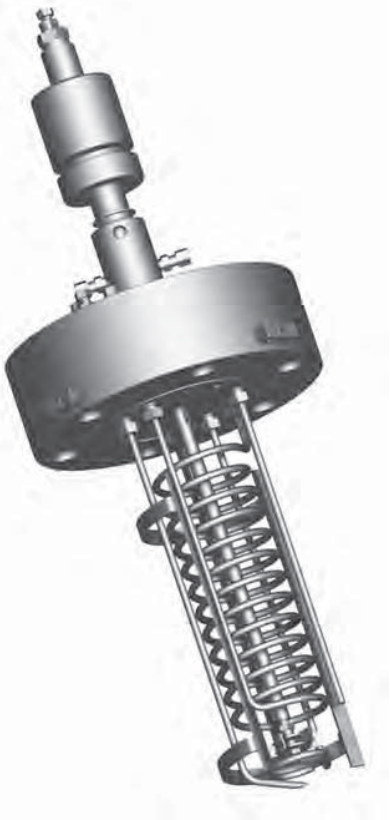
Maximum Allowable Working Pressure (MAWP)
3,300 psi @ 850° F*
(227 Bar @ 454° C)*

Minimum Design Metal Temperature (MDMT)
-20° F @ 3,300 psi
(-29° C @ 227 Bar)

Maximum Recommended Operating Pressure (MROP)
Varies based on gage, transducer, and rupture disk selection. Refer to Ordering Guide for Details.

Critical Dimensions:	2,000 ml	4,000 ml
Inside Diameter:	5.0" (127 mm)	5.0" (127 mm)
Straight Wall:	6.06" (153 mm)	12.31" (312 mm)

Approximate Dimensions:	Floor Stand
Overall Height**:	59.4" (1508 mm)
Width:	30.0" (762 mm)
Depth:	38.0" (965 mm)



4,000 ml EZE Seal Reactor Internals

* 850° F (454° C) rating is vessel mean wall temperature. Actual Process temperature will be lower.
** Overall height based on belt driven units. For actuals see standard drawings.

Stirred Reactors

2,000 and 4,000 ml EZE Seal Stirred Reactors Connection Schedule

All of the connections shown will be provided. For any accessories not ordered, the corresponding connection will be plugged. All connections (except safety head) are adapted from an AE high temperature F437 Flat Bottom connection to the "External" connection listed below.

Opening	Purpose	Internal	External	Location
"A"	Charging Port	3/8" Port	3/8˝ Tube	Cover Top
"B"	Gas Inlet	1/4" Tube	1/4˝ Tube	Cover Top
"C"	Sparge Tube	1/4" Tube	1/4" Tube	Cover Top
"D" & "H"	Cooling Coil (1/8 FNPT at cover)	1/4" Tube	1/4 " Tube	Cover Top
"E"	Thermowell	1/4" Tube	None	Cover Top
"F"	Safety Head (F750FB at Cover)	None	3/8 " FNPT	Cover Top
"G"	Vent and Pressure Indication	None	1/4" Tube	Cover Top
"J"	Blow Pipe	1/4" Tube	1/4" Tube	Cover Top
"K"	Liquid Sample	1/4" Tube	1/4" Tube	Cover Top
"L"	MagneDrive® Agitator	None	AE Special	Cover Top

Technical Specifications

Parker Autoclave Engineers provides a variety of optional accessories to custom configure each reactor. See the EZE-Seal Stirred Reactor Ordering Guide to configure a reactor for a specific application.

Seal Materials: Metal Gasket (vessel material, silver plated), Buna-N, Ethylene-Propylene, PTFE, Viton®, Silicone, or Kalrez® O-rings.
Approvals: Optional ASME Code Stamp, or CE Mark.
Stand: Floor Stand Only.
Body Lift: None or Manual Jack.
Agitator: MagneDrive® MAG075-01 Series with 7 in-lb (0.79 N-m) static torque, Purebon® (carbon graphite) bearings, or MagneDrive® MAG075-02 Series with 16 in-lb (1.8 N-m) static torque, Purebon® (carbon graphite) bearings.
Motors: 1/2 HP (0.37 KW) General Purpose DC with either: 90 V Armature (120 V unit), or 180 V Armature (240 V unit). 1/2 HP (0.37 KW) Explosion-Proof DC with either: 90 V Armature (120 V unit), or 180 V Armature (240 V unit). Air Motor with manual or electric speed adjustment.
Impeller Styles: AE Dispersimax, Straight Turbine, Axial Flow-Up, or Axial Flow-Down; All 2.0 inch (50.8 mm) diameter.
Baffle: Two (2) blade spring loaded baffle bar (removable).
Speed Sensor: Magnetic Sensor General Purpose, or Intrinsically-Safe Magnetic Sensor (Barrier Required)
Heating: Furnaces: 120 VAC (2000 ml Only), Single Phase or 240 VAC, Single Phase; 2,000 ml- 2,000 Watt, 4,000 ml - 4,000 Watt. Jacket: Removable, Spiral Baffled with O-ring Seals.

Internal Accessories Available:
Liquid Sample Tube, 1/4˝ Valve
Blow Pipe, 1/4˝ Valve
Sparge Tube, 1/4˝ Valve
Cooling Coil, 1/4˝ Tube
Process Thermocouple, Type J or K

External Accessories Available:
Vent Valve, 1/4˝ Valve
2.5˝ (63.5 mm) Dial Pressure Gage - Multiple ranges available
Pressure Transducers - Range Dependent on Gage
One or Two Gas Inlet, 1/4˝ Valves, Shared Connection
Catalyst Charging Valve, 3/8˝ Tube with 1/4˝ port
External Thermocouple, Type J or K
1/2˝ Port Manual Flush Valve

Supporting Information

Please refer to the following sections of the catalog for complimentary products and additional technical details.

- "EZE-Seal Stirred Reactor Ordering Guide" - Provides a step-by-step guide on how to configure the EZE-Seal Reactor to a specific application.
- "Instrumentation" - Details Autoclave Engineers' full line of control options for temperature, pressure and speed.
- "Agitation" - Provides additional specifications on the MagneDrive® magnetic agitator and available impeller systems.
- "Pressure Vessels" - Provides details on the EZE-Seal vessel assembly.
- "Stirred Reactor Selection Guide" - Provides general information on all of Autoclave Engineers' stirred reactors

Viton® and Kalrez® are registered trademarks of DuPont Dow Elastomers, Purebon® is a registered trademark of Pure Carbon.

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CE

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Bulletin SR -EZ-2/4L

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ZipperClave® Stirred Reactor Ordering Guide

Volume	Pressure Vessel	MagneDrive	Internal Accessories	External Accessories
Z _ _ _ ---	A B C D E F ---	G H J K L ---	M N O P Q ---	R S T U V W
	(Select from options below)		(See reverse)	(See reverse)

500 ml - "050" 2,000 ml - "200"
1,000 ml - "100" 4,000 ml - "400"

Pressure Vessel

A Vessel Material:
SS - 316 Stainless Steel
HC - HASTELLOY® [1] C-276

B Seal Materials:
B - Buna-N O-ring, 250°F (121°C) [2]
C - EPR O-ring, 300°F (149°C) [2]
D - PTFE O-ring, 400°F (204°C) [2]
E - Viton® [3] O-ring, 450°F (232°C) [2]
F - Silicone O-ring, 400°F (204°C) [2]
G - Kalrez® [3] O-ring, 500°F (260°C) [2]

C Bottom Port:
0 - None
1 - 1/2" Port Manual Valve (Requires Floor Stand) [4]
2 - AE *"Flat Bottom"* Connection

D Approvals Available:
0 - None
2 - CE (European Pressure Equipment Directive)
3 - Canadian Registration

E Stand:
0 - None
2 - Tall Bench Top (500 and 1,000 ml Only)
3 - Floor

F Body Lift Mechanism:
0 - None
1 - Manual Jack

MagneDrive® Agitator

G Models:
A - MAG075-01 Belt Driven
B - MAG075-02 Belt Driven
X - No MagneDrive® and opening plugged

H Bearings:
0 - None [5]
1 - Purebon® [6] (Carbon Graphite)
2 - Fluoropolymer with graphite fiber [7]

J Speed Sensors:
0 - None
1 - General Purpose
2 - Intrinsically Safe (IS Barrier not provided)

K Motors:
0 - None
1 - DC Variable Speed, 90 VDC, General Purpose
2 - DC Variable Speed, 180 VDC, General Purpose
3 - DC Variable Speed, 90 VDC, XP (Non-CE Mark)
4 - DC Variable Speed, 180 VDC, XP (Non-CE Mark)
5 - Air with Manual Speed Adjust
6 - Air with Electronic Speed Adjust
7 - AC Motor, XP CE Mark

L Impellers:
A - AE Dispersimax (6 blade) with Baffle Bar
B - Turbine (6 blade) with Baffle Bar
C - Axial Up (4 blade) with Baffle Bar
D - Axial Down (4 blade) with Baffle Bar
X - None [5]

NOTES:

1) HASTELLOY® is a registered trademark of Haynes International Inc.
2) Temperature limits are suggested. Actual performance will vary.
3) Viton ® and Kalrez® are registered trademarks of DuPont Dow Elastomers.
4) The drain valve is a "flush" design (no dead volume) that extends approximately 8 1/4" (210 mm) below the vessel.
5) Use this option only if X (No MagneDrive®) is selected as the model of MagneDrive® Agitator.
6) Purebon® is a registered trademark of Morgan AM & T Inc.
7) Fluoropolymer bearings have a maximum recommended service temperature of 500°F (260°C). Contact the factory to discuss application suitability.
8) MROP may be further reduced by temperature and number of cycles.

ZipperClave® Stirred Reactor Ordering Guide

Volume | Pressure Vessel | MagneDrive | Internal Accessories | External Accessories

Z _ _ _ --- A B C D E F --- G H J K L --- M N O P Q --- R S T U V W

(See reverse) (See reverse) (Select from options below)

Internal Accessories

M Liquid Sample:
0 - None, (Plugged Connection)
1 - Sample Tube Only
2- Tube With Manual Valve

N Blow Pipe:
0 - None, (Plugged Connection)
1 - Blow Pipe Only
2 - Blow Pipe with Manual Valve

O Sparge Tube:
0 - None, (Plugged Connection)
1 - Sparge Tube Only
2 - Sparge Tube with Manual Valve

P Cooling Coil:
0 - None, (Plugged Connection)
1 - Cooling Coil Only
2 - Cooling Coil with Manual Valve
3 - Cooling Coil with 1/4" Solenoid Valve (120V)
4 - Cooling Coil with 1/4" Solenoid Valve (240V)

Q Process Thermocouple:
0 - None, (Plugged Connection)
1 - Thermowell Only
2 - Thermowell with Type "K"
3 - Thermowell with Type "J"

External Accessories

R Vent Valve:
0 - None (Plugged Connection)
1 - Vent with Manual Valve

S Pressure Gage/Transducer
(Dictates Maximum Recommended Operating Pressure "MROP")
A - 600 psi Gage Only, (450 psi MROP)[8]
B - 1,000 psi Gage Only, (750 psi MROP)[8]
C - 2,000 psi Gage Only, (1,500 psi MROP)[8]
D - 3,000 psi Gage Only, (1,900 psi MROP)[8]
G - 600 psi Gage/Transducer, (450 psi MROP)[8]
H - 1,000 psi Gage/Transducer, (750 psi MROP)[8]
J - 2,000 psi Gage/Transducer, (1,500 psi MROP)[8]
K - 3,000 psi Gage/Transducer, (1,900 psi MROP)[8]
N - 600 psi Gage/ IS Transducer, (450 psi MROP)[8]
P - 1,000 psi Gage/ IS Transducer, (750 psi MROP)[8]
Q - 2,000 psi Gage/ IS Transducer, (1,500 psi MROP)[8]
R - 3,000 psi Gage/ IS Transducer, (1,900 psi MROP)[8]

T Heating & Cooling:
0 - None
1 - Electric 120 VAC, Single Phase
2 - Electric 240 VAC, Single Phase
5 - Baffled Removable Jacket, 1/4" FNPT Connections
450°F (232°C) Max.[2]

U Gas Inlet:
0 - None, (Plugged Connection)
1 - Gas Inlet Line with One (1) Manual Valve
2 - Gas Inlet Line with Two (2) Manual Valves (Shared Connection)

V Charging Valve:
0 - None, (Plugged Connection)
1 - 3/8" Manual Charging Valve

W External Thermocouple:
0 - None
1 - Type "K"
2 - Type "J"

Parker Autoclave Engineers®

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