High Temperature Bolted Closure

Stirred Reactors: 1,000 ml

Volume: 1000 ml*
Vessel MAWP:** 5,000 psi @ 950ºF (345 bar @ 510ºC)
Material of Construction: 316 Stainless Steel, Hastelloy® C276

* Consult factory for other volumes • ** Maximum Allowable Working Pressure

Principle of Operation:

The Parker Autoclave Engineers' High Temperature Bolted Closure Reactor has been designed for reliable high pressure operation. The seal is a metal gasket machined from the same material as the vessel. 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 high temperature bolted closure stirred laboratory reactor is a versatile high pressure and high temperature unit, that can be used for chemical synthesis of corrosive, hazardous and very reactive chemicals/petrochemicals, as well as materials research.

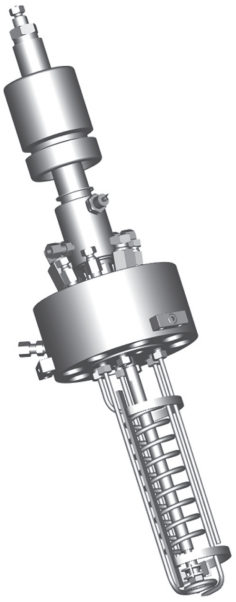
General Specifications:

Maximum Allowable Working Pressure (MAWP) - Design Pressure
5,000 psi @ 950° F (345 Bar @ 510° C) See Note

Minimum Design Metal Temperature (MDMT)
-20° F @ 5,000 psi (-29° C @ 345 Bar)

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

Critical Dimensions	1,000 ml
Inside Diameter	3.0" (76 mm)
Straight Wall	8.71" (221 mm)
Approximate Dimensions	**Floor Stand**
Overall Height***	61.8" (1570 mm)
Width	25.0" (635 mm)
Depth	27.1" (688 mm)



1000 ml Bolted Closure Reactor Internals

Note The user should be aware that the 950ºF (510ºC) 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.

*** Overall height based on belt driven units. Consult factory for overall height of other configurations.

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Features:

- Versatile product configuration
- Operating pressures as high as 4,270 psi @ 950ºF (294 bar @ 510ºC)
- Open vessel and remove body without disassembling pressure connections
- Available worldwide to meet codes such as ASME, CE and CRN
- Insulated cover and vessel flange for heating efficiency

Connection Schedule:

All of the connections shown will be provided. For any accessories not ordered, the corresponding connection will be plugged.

Opening	Purpose	Internal	External	Location	Smallest Diameter Orifice (nominal) in flow path
A	Charging Port	0.38" Port	3/8" O.D. Tube	Cover Top	0.25"
B	Gas Inlet	SW187 (3/16") Connection	1/4" O.D. Tube	Cover Top	0.109"
C	Sparge Tube †	3/16" O.D. Tube	1/4" O.D. Tube	Cover Top	0.031" †
D & H	Cooling Coil	3/16" O.D. Tube	1/4" O.D. Tube	Cover Side	0.125"
E	Vent & Pressure Indication	Branched into **F**	1/4" O.D. Tube	Cover Side	0.109"
F	Safety Head	0.19" Port	3/8" FNPT	Cover Top	0.187"
G	Thermowell ††	3/16" O.D. Tube	0.129" Port ††	Cover Top	N/A
J	Blow Pipe	3/16" O.D. Tube	1/4" O.D. Tube	Cover Top	0.109"
K	Liquid Sample	3/16" O.D. Tube	1/4" O.D. Tube	Cover Top	0.109"
L	MagneDrive® Agitator	1/2" O.D. Mixing Shaft	AE Special	Cover Top	N/A

† The tube that forms the sparge tube is 3/16" O.D. and 1/8" I.D. with a plug in the end. Nine .031" diameter holes are drilled in the sparge ring to bubble gas into the reactor.

† † The tube that forms the thermowell is 3/16" O.D. and 1/8" I.D. with a plug in the end. A 0.129" port is drilled in the cover to guide the thermocouple to the opening in the thermowell. Thermowell only provided if heating/cooling option is selected.

Technical Specifications:

Parker Autoclave Engineers provides a variety of optional accessories to custom configure your reactor.
See the **Ordering Guide** to configure a reactor for your specific application.

Seal Materials: Metal gasket (vessel material)
Approvals: Optional ASME code stamp, Canadian Registration or CE Mark
Stand: Tall Bench Top or Floor Stand
Body Lift: None or Manual Jack
Agitator: MagneDrive® MAG075-01 Series with 7 in-lb (0.79 N-m) static torque, Purebon®4 (carbon graphite) or FPGF bearings
MagneDrive® MAG075-02 Series with 16 in-lb (1.8 N-m) static torque, Purebon®4 (carbon graphite) or FPGF bearings
iMag075® Series with 7 in-lb (0.79 N-m) static torque, Purebon®4 (carbon graphite) or FPGF 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 electronic speed adjustment.
1/8 HP (0.09 KW) or 1/3 HP (0.25 KW) General Purpose DC with 130 V Armature
Impeller Styles: AE Dispersimax®, Straight Turbine, Axial Flow-Up, or Axial Flow-Down; All 1.25 inch (31.8 mm) diameter.
Baffle: Two (2) blade spring loaded baffle bar (removable)
Speed Sensor: Magnetic Sensor General Purpose
Heating Furnaces: 120 VAC or 240 VAC, Single Phase 1,700 Watt

Internal Accessories Available

- Liquid Sample Tube, optional 1/4" Valve
- Blow Pipe, optional 1/4" Valve
- Sparge Tube, optional 1/4" Valve
- Cooling Coil, optional manual or solenoid 1/4" Valve
- Process Thermocouple, Type K

External Accessories Available

- Vent Valve, 1/4" valve
- 2.5" (63.5 mm) Dial Pressure Gauge - multiple ranges available
- Pressure Transducer - Range dependent on gauge
- Inlet Valves, (1/4" O.D. Tube) either one or two on a shared connection
- External Thermocouple Type K
- 1/2" Centered Bottom Port with manual valve, flush bottom design (req. floor stand)

Supporting Information:

Engineering drawings are available upon request from Parker Autoclave Engineers for more detailed technical information. Reference our catalog for additional literature on Bolted Closure Ordering Guide, Instrumentation, Agitation, Pressure Vessels, and Stirred Reactors. The following drawings are available upon request from PAE for more detailed technical information

Drawing Number 40A-8362 - Bench Top/Light Floor Motor Options (Air and DC motors)
Drawing Number 30B-0792 - Belt Drive Assembly (AC Motor)
Drawing Number 30A-9638 - Manual Screw Jack Assembly

Drawings		Drawing Title
316 Stainless Steel	Hastelloy® C-276	
1000 ml	1000 ml	
40C-0445	40C-0533	Bolted Closure Reactor
30A-9605	30B-0382	MAG 075 MagneDrive® Assembly
30B-1912	30B-1937	1/4 Valve Rack

Ordering Guide:

Model Code			
H	1	0	0
Volume			

Pressure Vessel						
S	S	A	0	0	2	1
A	A	B	C	D	E	F

MagneDrive® Agitator				
A	1	1	1	A
G	H	J	K	L

Internal Accessories			
1	1	0	1
M	N	O	P

External Accessories				
1	D	1	1	0
R	S	T	U	V

Part Number Example: **H050SSA0021A111A11011D110** (example selections indicated in yellow below)

Model Code

Volume	
100	1,000 ml High Temperture Bolted Closure Reactor

Pressure Vessel

AA - Vessel Material	
SS	316 Stainless Steel
HC	Hastelloy®[1] C-276

B - Seal Material	
A	Metal Gasket (Vessel Material)

C - Body Bottom Connection	
0	None (No Connection)
1	1/2" Port Manual Valve (requires floor stand) [2]
2	Flat Bottom Connection

D - Approvals Available [8]	
0	None Required
1	ASME Code Stamp
2	CE Mark Compliance
3	Canadian Registration

E - Stand	
0	None
2	Tall Bench Top
3	Floor

F - Body Lift Mechanism	
0	None
1	Manual Jack
2	Manual Jack CE

MagneDrive® Agitator

G - MagneDrive® Agitator	
A	MAG075-01 Belt Driven
B	iMAG075 Inline
C	MAG075-02 Belt Driven
X	No MagneDrive® with opening plugged

H - Bearings	
0	None [3]
1	Purebon®[4] (Carbon Graphite)
2	Fluoropolymer with graphite fiber [5]
3	Purebon®[4] 3310

J - Speed Sensors	
0	None
1	General Purpose Hall Effect

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
C	Belt & Guard WITHOUT MOTOR
D	1/8 HP 0-130 VDC Variable Speed GP Inline
E	1/3 HP 0-130 VDC Variable Speed GP Inline
F	Air Motor - Manual Speed Adjust Inline
G	Air Motor - Electronic Speed Adjust Inline

L - Impellers / Shaft / Baffles	
A	AE Dispersimax™ (6 blades) with Baffle Bar
B	Turbine (6 blades) with Baffle Bar
C	Axial-Up (4 blades) with Baffle Bar
D	Axial-Down (4 blades) with Baffle Bar
X	None [3]

Internal Accessories

M - Liquid Sample	
0	None, Plugged Connection
1	Sample Tube Only
2	Sample Tube with Manual Valve
5	Sample Tube with Manual Valve and Filter

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" (120 Volt) Solenoid Valve
4	Cooling Coil with 1/4" (240 Volt) Solenoid Valve

NOTES:

1. HASTELLOY® is a registered trademark of Haynes International Inc.
2. The drain valve is a "Flush" design (no dead volume) that extends approximately 8.25" (210 mm) below the vessel.
3. Use this option only if X (No MagneDrive®) is selected as the model of MagneDrive® agitator
4. Purebon® is a registered trademark of Morgan AM&T.
5. Fluoropolymer bearings have a maximum recommended service temperature of 500°F (260°C).
6. MROP may be further reduced by temperature and number of cycles.
7. When heating/cooling is selected, the reactor is supplied with a process Type K Thermocouple and Thermowell, and an external Type K Thermocouple. When no heating/cooling is selected, the reactor will be supplied with a plugged connection for the process thermocouple.
8. Consult factory for pricing and rating of code vessels.

Parker Autoclave Engineers reserves the right to substitute an equivalent material for trademark material. Parker Autoclave Engineers purchases substitute materials based on specification conformance, typically a widely accepted specification created by an industry stardard organization.

External Accessories

R - Vent Valve	
0	None, Plugged Connection
1	Vent with Manual Valve
2	High Volume Vent with Solenoid Valve (120 Volt)
3	High Volume Vent with Solenoid Valve (240 Volt)
4	BPR Digital (120 Volt)
5	BPR Digital (240 Volt)
7	BPR Digital with High Volume Vent 120 VAC Solenoid
8	BPR Digital with High Volume Vent 240 VAC Solenoid

S - Pressure Gauge/Transducer (MROP = Max. Recommended Operating Pressure)	
A	600 psi Gauge Only (450 psi MROP) [6]
B	1,000 psi Gauge Only (750 psi MROP) [6]
C	2,000 psi Gauge Only (1,500 psi MROP) [6]
D	3,000 psi Gauge Only (2,250 psi MROP) [6]
E	5,000 psi Gauge Only (3,750 psi MROP) [6]
F	7,500 psi Gauge Only (4,700 psi MROP) [6]
G	600 psi Gauge/1 ksi Transducer (450 psi MROP) [6]
H	1,000 psi Gauge/1 ksi Transducer (750 psi MROP) [6]
J	2,000 psi Gauge/3 ksi Transducer (1,500 psi MROP) [6]
K	3,000 psi Gauge/3 ksi Transducer (2,250 psi MROP) [6]
L	5,000 psi Gauge/5 ksi Transducer (3,750 psi MROP) [6]
M	7,500 psi Gauge/10 ksi Transducer (4,700 psi MROP) [6]
N	600 psi Gauge/1 ksi IS Transducer (450 psi MROP) [6]
P	1,000 psi Gauge/1 ksi IS Transducer (750 psi MROP) [6]
Q	2,000 psi Gauge/ 3 ksi IS Transducer (1,500 psi MROP) [6]
R	3,000 psi Gauge/3 ksi IS Transducer (2,250 psi MROP) [6]
S	5,000 psi Gauge/5 ksi IS Transducer (3,750 psi MROP) [6]
T	7,500 psi Gauge/10 ksi IS Transducer (4,700 psi MROP) [6]

T - Heating and Cooling [7]	
0	None
1	Electric 120 VAC, Single Phase
2	Electric 240 VAC, Single Phase
3	120 VAC, Purgeable Furnace
4	240 VAC, Purgable Furnace

U - Gas Inlet	
0	None, Plugged Connection
1	Gas Inlet Line with One (1) Manual Valve
2	Gas Inlet Line with Two (2) Manual Valve (Shared Connection)
3	Forward Pressure Regulation (FPR) - Digital 120VAC
4	Forward Pressure Regulation (FPR) - Digital 240 VAC

V - Charging Valve	
0	None, Plugged Connection
1	3/8" Manual Charging Valve
2	Manual Valve with 8cc Charging Cartridge
3	Manual Valve with 20cc Charging Cartridge
4	Reflux Condenser

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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.

Caution! Parker Autoclave Engineers Valves, Fittings, Systems, 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.

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