

Checkball Piston Pumps For Water-Based Fluids

Fixed displacement checkball pumps are compatible with a variety of water-based and other low-lubricity fluids. Bi-directional shaft rotation provides constant direction of output flow regardless of drive shaft rotation.

MAINTENANCE-FREE DESIGN

The single-fluid checkball design uses the pumped fluid for internal bearing lubrication. This eliminates the potential for fluid cross-contamination, possible in other designs with isolated lubrication. It also avoids the cost of a lubrication circuit.

RELIABLE HIGH PRESSURE

Individual piston check valves provide long service life and greater volumetric efficiency, especially at high pressures and with low-lubricity fluids.

The check valves take the place of a valveplate in other pump designs. With no rotating sealing surface, checkball pumps are resistant to wearing and scoring.

TYPICAL APPLICATIONS

These pumps are ideal for use in wellhead safety control systems and other subsea applications, providing long life operating at high pressures with water-based fluids.

They are also used on hydroform presses, and other applications requiring environmentally-friendly or fire-resistant fluids.

PUMP SELECTION

The table shows specifications for standard pressure models, and for high pressure "H" option models for maximum pressures to 15 000 psi (1040 bar). The "H" option requires high pressure coned and threaded or B.S.P. outlet ports.

Refer to "Typical Model Code" to specify shaft, seal and outlet port options.

PF4300 SERIES
2.2 to 8.2 gpm (8,3 to 31,0 L/min) at 1800 rpm
8000 to 15 000 psi (560 to 1040 bar)



Specifications

Pump Models	Output Flow at 1200 rpm ^①		Output Flow at 1500 rpm ^{①②}		Output Flow at 1800 rpm ^{①②}		Maximum Pressure		Rated Speed rpm ^②	Maximum Speed rpm ^②
	U.S. gpm	L/min	U.S. gpm	L/min	U.S. gpm	L/min	psi	bar		
PF4303-11	1.5	5,6	1.8	6,9	2.2	8,3	8000	560	1200	1800
PF4304-11	2.1	8,1	2.7	10,1	3.2	12,1	8000	560	1200	1800
PF4305-11	2.5	9,3	3.1	11,7	3.7	14,0	8000	560	1200	1800
PF4306-11	3.1	11,6	3.8	14,5	4.6	17,4	8000	560	1200	1800
PF4308-11	3.6	13,6	4.5	17,0	5.4	20,4	8000	560	1200	1800
PF4309-11	4.0	15,1	5.0	18,9	6.0	22,7	8000	560	1200	1800
PF4310-11	4.5	17,1	5.7	21,4	6.8	25,7	8000	560	1200	1800
PF4312-11	5.5	20,7	6.8	25,9	8.2	31,0	8000	560	1200	1800
PF4303H-11	1.3	4,8	1.6	6,2	2.0	7,5	15 000	1040	1200	1800
PF4304H-11	2.0	7,6	2.5	9,5	3.1	11,7	12 000	830	1200	1800
PF4305H-11	2.3	8,9	2.9	11,0	3.6	13,6	10 000	700	1200	1800
PF4306H-11	2.9	11,1	3.7	13,9	4.4	16,6	10 000	700	1200	1800
PF4308H-11	3.5	13,2	4.3	16,5	5.3	19,9	10 000	700	1200	1800
PF4309H-11	3.9	14,7	4.8	18,2	5.9	22,3	10 000	700	1200	1800
PF4310H-11	4.4	16,7	5.5	21,0	6.7	25,3	10 000	700	1200	1800
PF4312H-11	5.4	20,4	6.7	25,6	8.1	30,7	10 000	700	1200	1800

^① Output flow based on typical performance using 33 SUS (1,9 cSt) water glycol fluid at maximum pressure with pressurized inlet where required. Refer to the "Minimum Inlet Pressure" table on page 2.

^② Contact the sales department for operation above the rated speed of 1200 rpm.

INSTALLATION AND OPERATING

Refer to separate Bulletin PSI.CB for general installation and operating recommendations.

All dimensions are shown in inches (millimeters in parentheses) and are nominal.

Note that Models PF4303 and PF4304 have three pistons; Models PF4305, PF4308, PF4309 and PF4310 have five pistons; and Models PF4306 and PF4312 have six pistons.

Mounting

S.A.E. D 4-bolt pattern with 0.25 inch (6,4 mm) pilot engagement.

Shaft Options

Standard keyed shaft, 1.250 inch (31,75 mm) diameter;

Optional spline shaft, 1.248/1.247 inch diameter standard S.A.E. 14 tooth, 12/24 D.P. 30° involute spline.

Outlet Port Options

Standard pressure models have S.A.E. ports. High pressure "H" option models require the use of outlet port option "A" (Autoclave Medium Pressure, Butech M/P or equivalent fittings), or outlet port option "B" (British Standard Pipe fittings).

As shown, the outlet port on these pumps is machined in a block integrally mounted to the pump barrel. Refer to "Typical Model Code" on page 4 to specify the port.

Inlet Conditions

Pumps may require pressurized inlet conditions at higher speeds. Failure to meet minimum inlet requirements will result in slight flow reduction. Refer to the table.

Minimum Inlet Pressure^①

Pump Models	Operating Speed					
	1200 rpm		1500 rpm		1800 rpm	
	psi	bar	psi	bar	psi	bar
PF4303, PF4304, PF4305 and PF4306	0	0	0	0	0	0
PF4308	0	0	0	0	5	0,4
PF4309	0	0	5	0,4	10	0,7
PF4310	0	0	5	0,4	15	1,0
PF4312	0	0	5	0,4	15	1,0

① Values shown are based on fluid viscosity of 33 SUS (1,9 cSt).

Hydraulic Fluid Viscosity Guidelines^①

Operating					
Minimum		Maximum		Start-up	
SUS	cSt	SUS	cSt	SUS	cSt
31	1,3	927	200	927	200

① If fluid conditions fall outside of the range shown, contact the sales department.

Orientation/Drive

Shaft horizontal with inlet vertically up is preferred. Vertical shaft mounting is possible, but requires connecting a line to the bleed port in the pump housing. Contact the sales department for more information.

Standard Seals

Fluorocarbon (Viton® or Fluorel®) with high-pressure shaft seal.

Minimum Filtration Levels

Pump inlet: 150 μ nominal;
Pressure or return line: 25 μ nominal.

While finer filtration levels than these are desirable and will result in longer component life, restricting flow to the pump inlet should be avoided. Minimum recommended inlet conditions must be maintained.

Weight (Mass)

116 lb (53 kg)

FLUID RECOMMENDATIONS

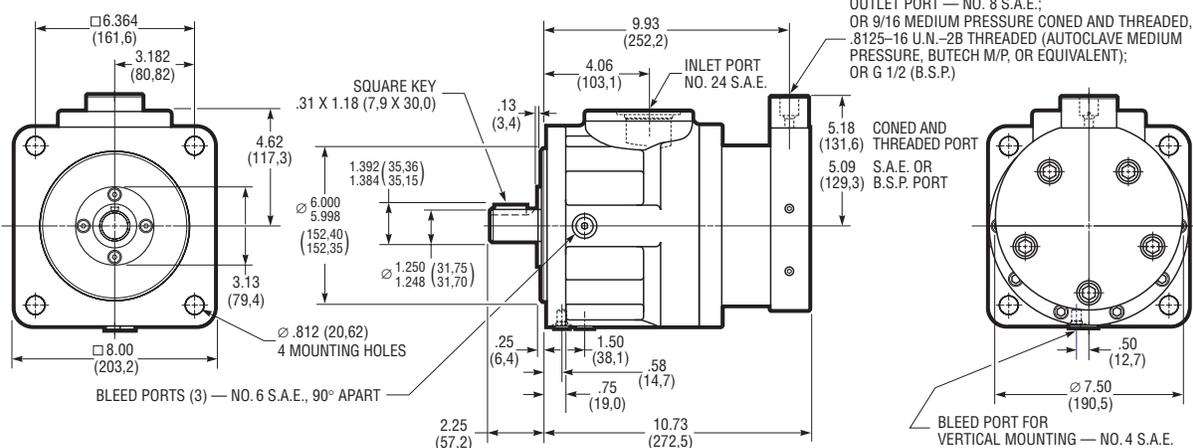
Special Fluid Operation

Because of the wide range of water-based fluid characteristics, contact the sales department for a review of the application requiring non-petroleum based fluid.

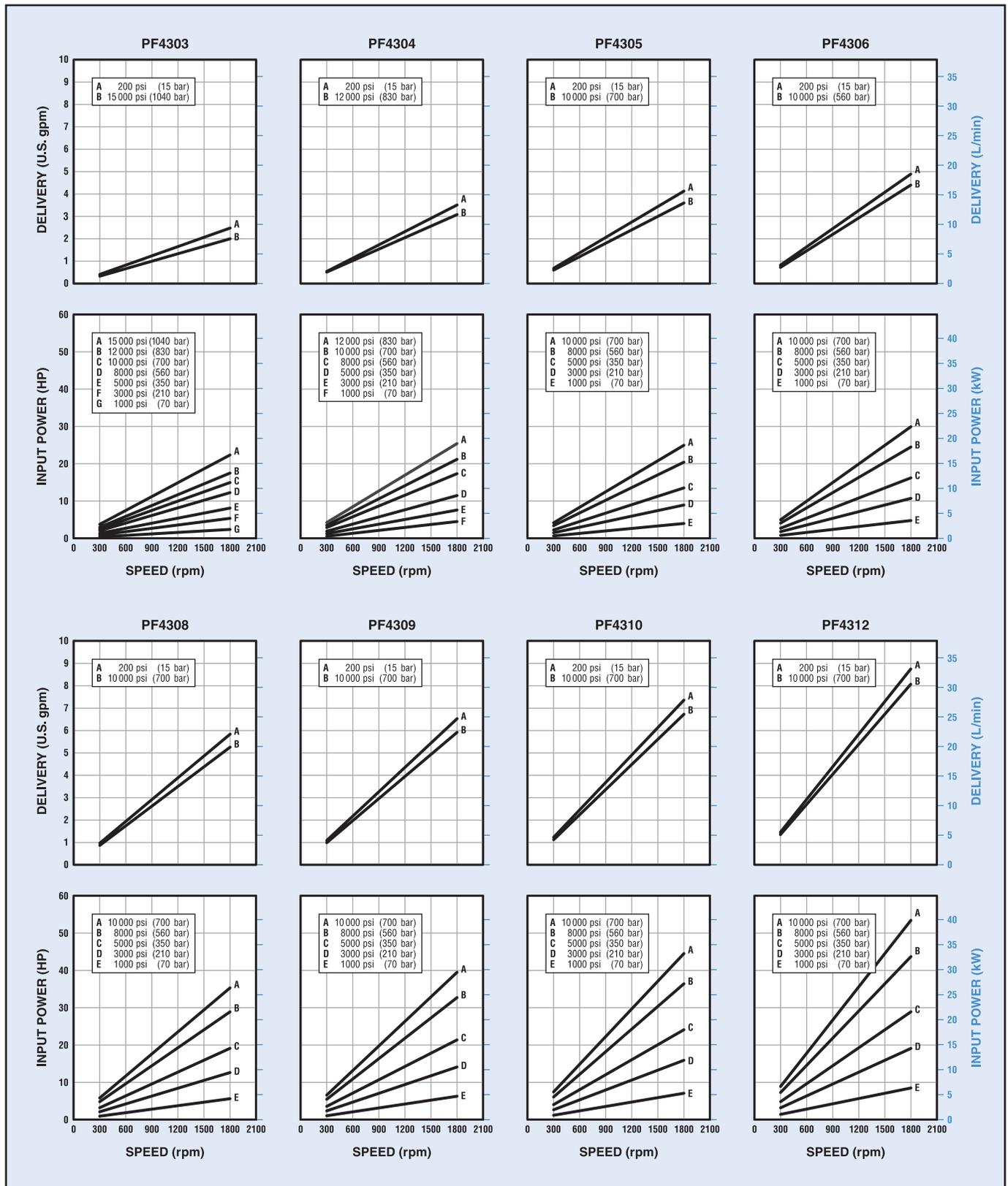
Viscosity Specifications

Using fluid with the correct viscosity range is critical to achieving long component life.

Fluid conditions outside the ranges shown in the table may result in reduced pump output, requiring pressurized inlet conditions. For more information, contact the sales department.



Typical Performance Curves



Typical performance curves are based on 33 SUS (1,9 cSt) water glycol fluid with pressurized inlet where required. Refer to the "Minimum Inlet Pressure" table on page 2.

TYPICAL MODEL CODE

PF43

03

H - S

XV

A

-

1

1

Pump Type	
PF43	Fixed Displacement Checkball Pump

Output Flow (At 1800 rpm, at maximum pressure) ^{①②}	
03	Standard: 2.2 gpm (8,3 L/min) "H" Option: 2.0 gpm (7,5 L/min)
04	Standard: 3.2 gpm (12,1 L/min) "H" Option: 3.1 gpm (11,7 L/min)
05	Standard: 3.7 gpm (14,0 L/min) "H" Option: 3.6 gpm (13,6 L/min)
06	Standard: 4.6 gpm (17,4 L/min) "H" Option: 4.4 gpm (16,6 L/min)
08	Standard: 5.4 gpm (20,4 L/min) "H" Option: 5.3 gpm (19,9 L/min)
09	Standard: 6.0 gpm (22,7 L/min) "H" Option: 5.9 gpm (22,3 L/min)
10	Standard: 6.8 gpm (25,7 L/min) "H" Option: 6.7 gpm (25,3 L/min)
12	Standard: 8.2 gpm (31,0 L/min) "H" Option: 8.1 gpm (30,7 L/min)

① Output flows based on typical performance at maximum pressure. Refer to performance curves for flows at lower pressures.

② Models PF4303 and PF4304 have three pistons; Models PF4305, PF4308, PF4309 and PF4310 have five pistons; Models PF4306 and PF4312 have six pistons.

Ports	
No Code	Inlet No. 24 S.A.E.; Outlet No. 8 S.A.E. ^①
A	Inlet No. 24 S.A.E.; Outlet 9/16 Medium Pressure Coned and Threaded, .8125-16 U.N.-2B Threaded ^②
B	Inlet No. 24 S.A.E.; Outlet G 1/2 (B.S.P.) ^③

① Not recommended for operation above 8000 psi (560 bar). Contact the fitting manufacturer for the pressure rating of the fitting.

② High pressure port uses Autoclave Medium Pressure, Butech M/P or equivalent fitting.

③ Outlet port uses British Standard Pipe fitting. Not recommended for operation above 10 000 psi (700 bar).

Design Number

Modification Number

Seals	
XV	All Fluorocarbon (Viton® or Fluorel®) with High Pressure Shaft Seal

Drive Shaft	
No Code	Keyed, 1.250 inch (31,75 mm) diameter
S	S.A.E. Spline, 1.250 inch (31,75 mm)

Operating Pressure	
No Code	Standard Pressure
H	High Pressure ^①

① Requires "A" or "B" port option.

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