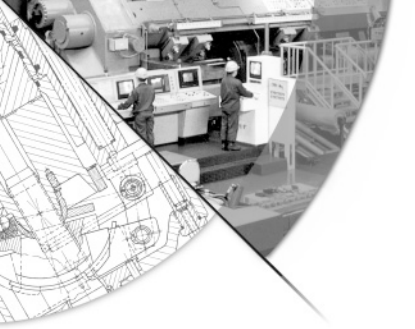
Oilgear

Check Type Prefill & Exhaust Valves

Bulletin 86620



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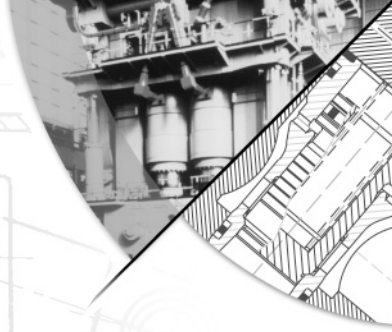

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Every Oilgear product is shipped to you with our Performance Assurance — a corporate commitment to stay with your installation until our equipment performs as specified.

Hydraulic equipment and systems have been Oilgear's primary business since 1921. For decades, we have developed hydraulic techniques to meet the unique needs and unusual fluid power problems of machinery builders and users worldwide, matching fluid power systems to a tremendous range of applications and industries. Our exclusive Performance Assurance program is built upon that strong foundation.

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PV 040 -250 Cylinder Prefill and Exhaust Valves

FEATURES AND BENEFITS

2-way Seated Type

- 040 to 250 mm
- Mounting Styles:
  - Cylinder & 90º line connection
  - Cylinder & In-tank connection
- With or without integral decompression
- To 315 bar (4,568 psi) (refer to chart)
- Oil and Synthetic Fluids
- Water Base Fluids - consult factory

PV Prefill Valve Flow Rating

		Mounting Style			
		Cylinder & 90°Line Connection		Cylinder In-Tank	
Size	Maximum Pressure bar (psi)	Rated Flow		Rated Flow	
		Prefill lpm (gpm)	Exhaust lpm (gpm)	Prefill lpm (gpm)	Exhaust lpm (gpm)
040	315 (4,568)	152 (40)	352 (93)		
050	315 (4,568)	235 (62)	549 (145)		
063	315 (4,568)	372 (98)	859 (227)		
080	315 (4,568)	606 (160)	1,400 (370)		
100	315 (4,568)	940 (248)	2,169 (573)	940 (248)	2,169 (573)
125	315 (4,568)	1,480 (391)	3,114 (902)	1,480 (391)	3,114 (902)
150	315 (4,568)	2,120 (560)	4,890 (1,292)	2,120 (560)	4,890 (1,292)
200	315 (3,568)	3,800 (1,004)	8,360 (2,208)	3,800 (1,004)	8,360 (2,208)
250	315 (3,568)	6,000 (1,585)	13,200 (3,487)	6,000 (1,585)	3,200 (3,487)

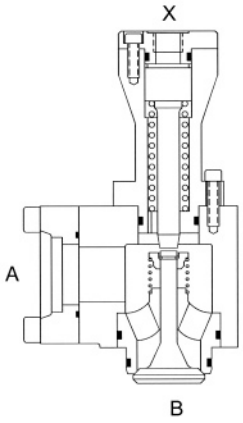
FEATURES AND BENEFITS

PV 040 - 080

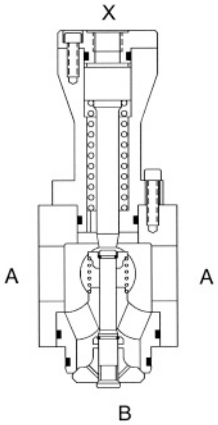
Description
Model PV Valves are check valves with seat type construction, providing leak-free closure in checked direction (B to A) and free flow in the reverse direction (A to B)

The Poppet can be forced open by providing pilot pressure via port "X" allowing flow from port "B" to port "A." These valves have an optional decompression feature, which allows the poppet to open progressively, achieving rapid but smooth decompression. To influence opening and closing times a throttle/check valve in the pilot line is recommended.

Flange "A" can be rotated through 360° around the vertical axis to facilitate easy assembly.

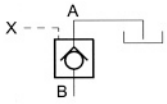


Prefill valve without decompression feature
(Model shown with flange bolted to port A).



Prefill valve with decompression feature
(Model suitable for mounting inside the oil tank).

Hydraulic symbol

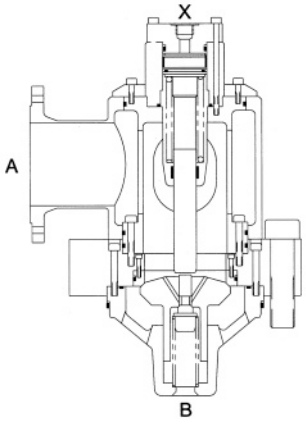


PV 100 - 250

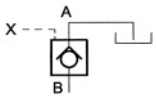
Description
Model PV Valves are check valves with seat type construction, providing leak-free closure in checked direction (B to A) and free flow in the reverse direction (A to B)

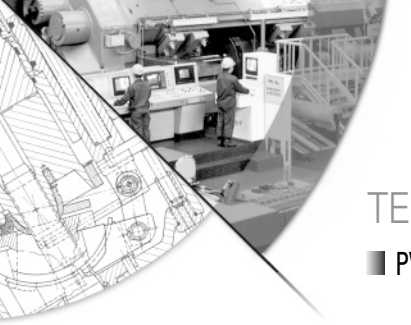
The Poppet can be forced open by providing pilot pressure via port "X" allowing flow from port "B" to port "A." These valves have an optional decompression feature, which allows the poppet to open progressively, achieving rapid but smooth decompression. To influence opening and closing times a throttle/check valve in the pilot line is recommended.

Flange "A" can be rotated through 360° around the vertical axis to facilitate easy assembly.



Hydraulic symbol





TECHNICAL DATA

PV 040 - 080 Prefill Valves

- Construction — Poppet type, Pilot operated
- Mounting type — Inside Fluid Tank or flanged "A" port
  Special machined cavity for port "B"
- Mounting position — Optional
- Flow direction — Free flow from port "A" to port "B"
  Piloted flow from port "B" to port "A"
- Operating pressure — Port "A" = 16 bar (232 psi)
  Port "B" and "X" = 315 bar (4,568 psi)
- Cracking pressure — 0.2 bar (3 psi)
- Pilot pressure required to — Px > [(Pb - Pa) x 2] + 8 bar (116 psi) to open main valve poppet
- Flow from port "B" to port "A" — Px > [(Pb - Pa) / 5] + 8 bar (116 psi) to open decompression poppet

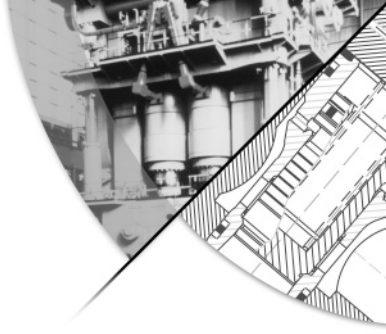
(Not applicable for valve without decompression feature)

Where,
Px = Pilot pressure at port "X" (bar or psi)
Pa = Pressure at port "A" (bar or psi)
Pb = Pressure at port "B" (bar or psi)

- Pilot Volume.....

Size	040	050	063	080
Cm^2 $(in)^2$	10.9 (0.7)	21.3 (1.3)	38.9 (2.4)	77.6 (4.7)

- Flow handling capacity — Refer to graphs
- Hydraulic medium — Mineral oil or synthetic
  Water base fluids – consult factory
- Viscosity range — 10 cSt to 380 cSt (59 to 1760 SUS)
- Working temperature — -20º C to +70º C (-4º to 158º F)
- Fluid cleanliness requirement — ISO 4406, 19/16/13 or better
- Weight (mass) — Refer to individual table



TECHNICAL DATA

PV 100 - 250 Prefill Valves

- Construction — Poppet type, Pilot operated
- Mounting type — Inside Fluid Tank or flanged "A" port
  Special machined cavity for port "B"
- Mounting position — Optional
- Flow direction — Free flow from port "A" to port "B"
  Piloted flow from port "B" to port "A"
- Operating pressure — Port "A" = 16 bar (232 psi)
  Port "B" and "X" = 315 bar (4,568 psi)
- Cracking pressure — 0.2 bar (3 psi)
- Pilot pressure required to — Px > [(Pb - Pa) x 4] + 10 bar (145 psi) to open main valve poppet
- Flow from port "B" to port "A" — Px > [(Pb – Pa) / 10] + 10 bar (145 psi) to open decompression poppet

(Not applicable for valve without decompression feature)

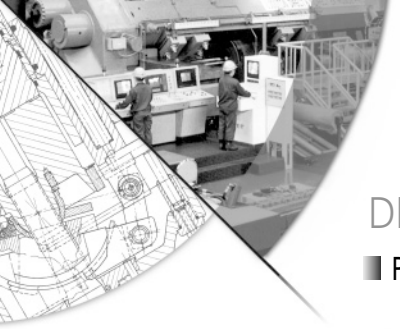
Where,
Px = Pilot pressure at port "X" (bar or psi)
Pa = Pressure at port "A" (bar or psi)
Pb = Pressure at port "B" (bar or psi)

- Pilot Volume .....

Size	100	125	150	200	250
Cm^3 $(in)^3$	46.8 (2.9)	88.5 (5.4)	135.7 (8.3)	313.6 (19.1)	544 (33.2)

- Flow handling capacity — Refer to graphs
- Hydraulic medium — Mineral oil or synthetic
  Water base fluids – consult factory
- Viscosity range — 10 cSt to 380 cSt (59 to 1760 SUS)
- Working temperature — -20º C to +70º C (-4º to 158º F)
- Fluid cleanliness requirement — ISO 4406, 19/16/13 or better
- Weight (mass) — Refer to individual table

- **For valve sizes PV 200 and PV 250 - consult factory.**

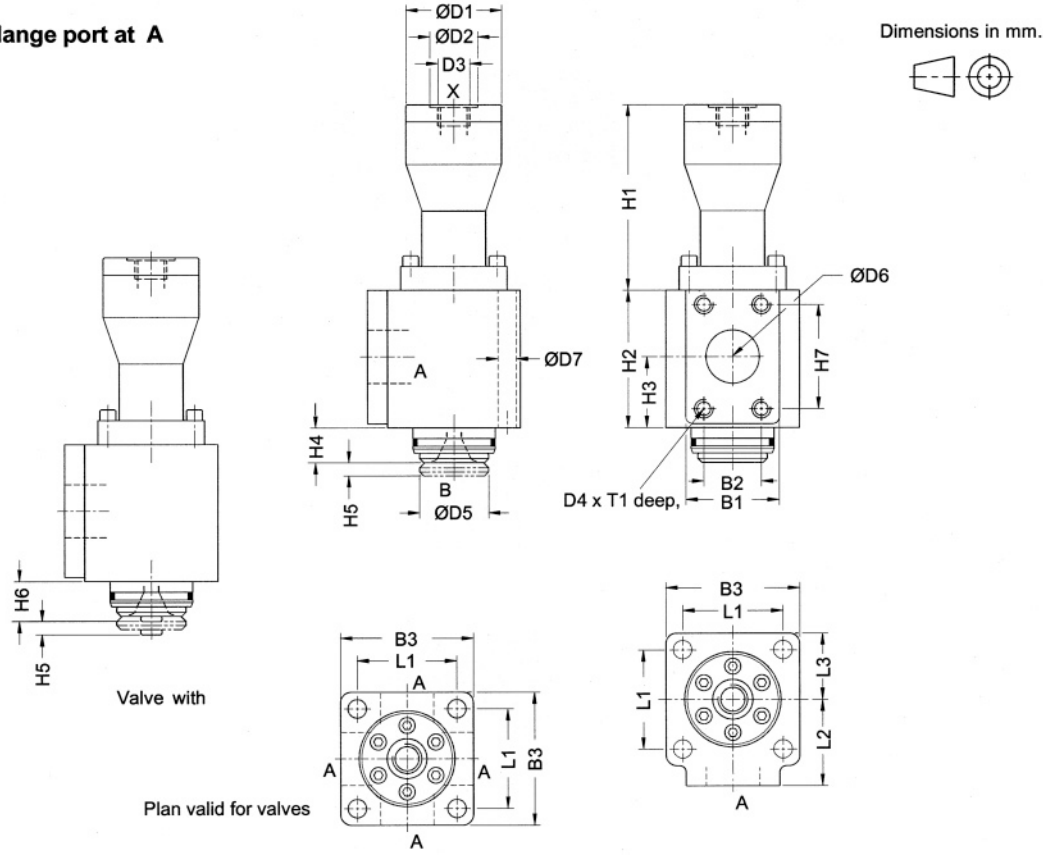


DIMENSIONS & WEIGHTS

PV 040 - 080

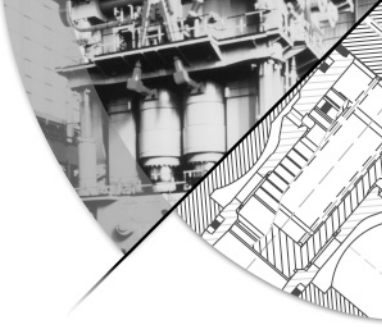
Valve with flange port at A

Dimensions in mm.



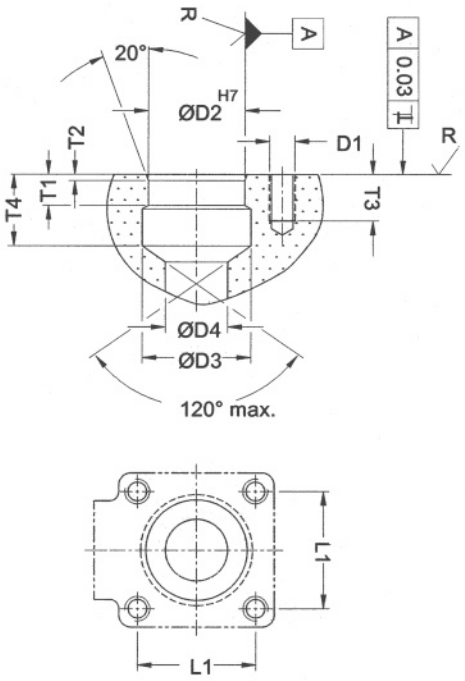
Size	Mass kg (lb)	B1 mm (inch)	B2 mm (inch)	B3 mm (inch)	ØD1 mm (inch)	ØD2 mm (inch)	D3 mm (inch)	D4 mm (inch)	ØD5 mm (inch)	ØD6 mm (inch)	ØD7 mm (inch)
040	9 (20)	70 (2.76)	43 (1.693)	100 (3.94)	72 (2.83)	30 (1.181)	G 1/2 (#8 SAE)	M12	52 (2.05)	40 (1.57)	18 (0.71)
050	14 (31)	100 (3.94)	51 (2.008)	120 (4.72)	87 (3.43)	30 (1.181)	G 1/2 (#8 SAE)	M12	67 (2.64)	50 (1.97)	22 (0.87)
063	25 (55)	115 (4.53)	62 (2.441)	145 (5.71)	105 (4.13)	30 (1.181)	G 1/2 (#8 SAE)	M16	82 (3.23)	63 (2.48)	26 (1.02)
080	45.5 (100)	115 (4.53)	62 (2.441)	180 (7.09)	132 (5.20)	36 (1.417)	G 3/4 (#12 SAE)	M16	102 (4.02)	76 (2.99)	33 (1.30)

Size	H1 mm (inch)	H2 mm (inch)	H3 mm (inch)	H4 mm (inch)	H5 mm (inch)	H6 mm (inch)	H7 mm (inch)	L1 mm (inch)	L2 mm (inch)	L3 mm (inch)	T1 mm (inch)
040	127 (5.00)	103 (4.06)	53 (2.09)	26 (1.02)	10 (0.39)	30 (1.18)	78 (3.071)	75 (2.953)	65 (2.56)	50 (1.97)	18 (0.71)
050	157 (6.18)	113 (4.45)	58 (2.28)	32.5 (1.28)	12 (0.47)	37.5 (1.47)	89 (3.504)	90 (3.543)	75 (2.95)	60 (2.36)	18 (0.71)
063	186 (7.32)	139 (5.47)	71.5 (2.81)	34 (1.34)	15 (0.59)	40 (1.57)	106.5 (4.193)	105 (4.134)	90 (3.543)	72.5 (2.85)	25 (0.98)
080	237 (9.33)	160 (6.30)	77.5 (3.05)	36 (1.42)	20 (0.79)	43 (1.69)	106.5 (4.193)	130 (5.118)	102 (4.016)	90 (3.54)	25 (0.98)



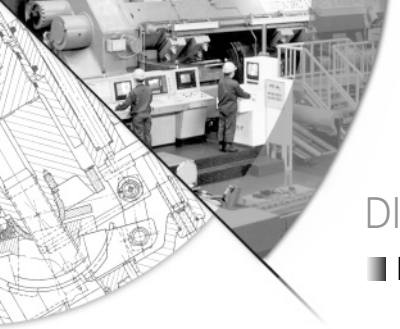
DIMENSIONS & WEIGHTS

PV 040 - 080



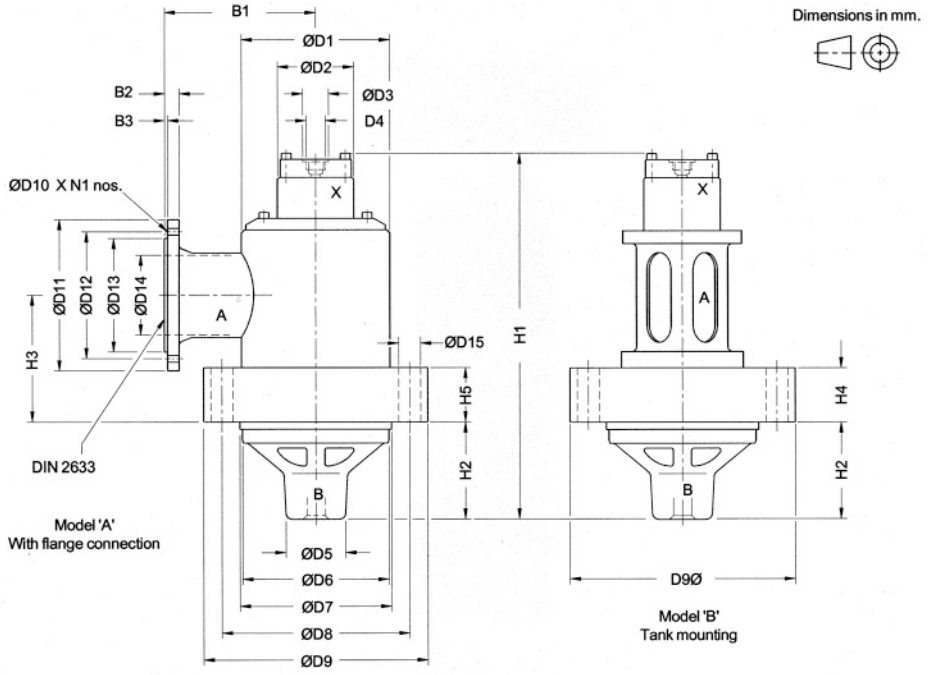
Mounting cavity details

Size	D1	ØD2 mm (inch)	ØD3 H7 mm (inch)	ØD4 mm (inch)	L1 mm (inch)	T1 mm (inch)	T2 mm (inch)	T3 mm (inch)	T4 min mm (inch)	Valve Mounting H.S.C. Screws	Tightening Torque
040	M16 x 2.0	62 (2.441)	66 (2.598)	40 (1.575)	75 (2.953)	20 (0.787)	4 (0.157)	27 (1.063)	46 (1.811)	M16 x 2.0 130 L, 4 nos.	290 Nm (215 ft - lb)
050	M20 x 2.5	80 (3.150)	84 (3.307)	50 (1.969)	90 (3.543)	25 (0.984)	5 (0.197)	27 (1.063)	57 (2.244)	M20 x 2.5 140 L, 4 nos.	570 Nm (420 ft - lb)
063	M24 x 3.0	95 (3.740)	104 (4.094)	63 (2.480)	105 (4.134)	25 (0.984)	5 (0.197)	42 (1.653)	64 (2.520)	M24 x 3.0 180 L, 4 nos.	980 Nm (720 ft - lb)
080	M30 x 3.5	115 (4.528)	130 (5.118)	80 (3.150)	130 (5.118)	30 (1.181)	5 (0.197)	65 (2.559)	76 (2.992)	M30 x 2.0 200 L, 4 nos.	1960 Nm (1445 ft - lb)



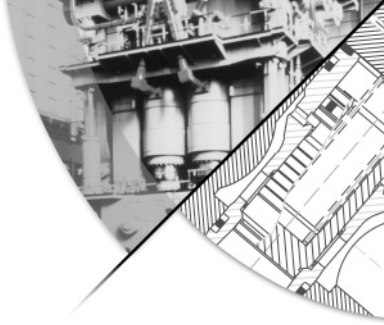
DIMENSIONS & WEIGHTS

PV 100 - 250

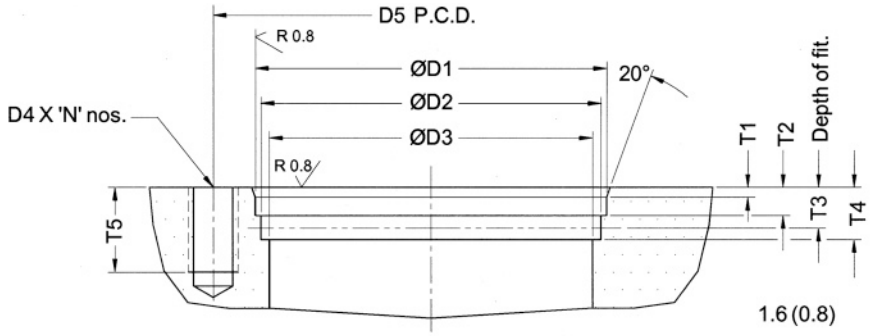


Size	Mass kg (lb)	B1 mm (inch)	B2 mm (inch)	B3 mm (inch)	ØD1 mm (inch)	ØD2 mm (inch)	D3 mm (inch)	D4 mm (inch)	ØD5 mm (inch)	ØD6 mm (inch)	ØD7 mm (inch)	ØD8 mm (inch)
100	79 (174)	217 (8.54)	20 (0.79)	3 (0.12)	195 (7.68)	105 (4.13)	36 (1.417)	G 3/4 (#12 SAE)	80 (3.150)	191.5 (7.539)	200 (7.874)	250 (9.843)
125	120 (264)	247 (9.72)	22 (0.87)	3 (0.12)	245 (9.65)	135 (5.31)	36 (1.417)	G 3/4 (#12 SAE)	105 (4.134)	241.5 (9.508)	250 (9.843)	310 (12.205)
150	167.5 (368)	260 (10.24)	22 (0.87)	3 (0.12)	273 (10.75)	142 (5.59)	44 (1.732)	G1 (#16 SAE)	110 (4.331)	281.5 (11.083)	290 (11.417)	350 (13.780)
200	310 (682)	312 (12.28)	24 (0.94)	3 (0.12)	356 (14.02)	185 (7.28)	54 (2.126)	G1 1/4 (#20 SAE)	135 (5.315)	368.5 (14.508)	380 (14.961)	445 (17.520)
250	520 (1144)	328 (12.91)	26 (1.02)	3 (0.12)	420 (16.54)	230 (9.06)	54 (2.126)	G1 1/4 (#24 SAE)	160 (6.299)	438.5 (17.264)	450 (17.717)	525 (20.669)

Size	ØD9 mm (inch)	ØD10 mm (inch)	ØD11 mm (inch)	ØD12 mm (inch)	ØD13 mm (inch)	ØD14 mm (inch)	ØD15 mm (inch)	H1 mm (inch)	H2 mm (inch)	H3 mm (inch)	H4 mm (inch)	N1
100	295 (11.61)	18 (0.71)	220 (8.66)	180 (7.087)	158 (6.220)	107 (4.21)	33 (1.30)	485 (19.09)	136 (5.35)	171 (6.73)	81 (3.19)	8
125	370 (14.57)	18 (0.71)	250 (9.84)	210 (8.268)	188 (7.402)	132 (5.20)	40 (1.57)	597 (23.50)	160 (6.30)	210 (8.27)	90 (3.54)	8
150	407 (16.02)	23 (0.91)	285 (11.22)	240 (9.449)	212 (8.346)	159 (6.26)	40 (1.57)	708 (27.87)	180 (7.09)	250 (9.84)	100 (3.94)	8
200	510 (20.08)	23 (0.91)	340 (13.39)	295 (11.614)	268 (10.551)	207 (8.15)	45 (1.77)	980 (38.58)	240 (9.45)	352.5 (13.88)	120 (4.72)	12
250	590 (23.23)	26 (1.02)	405 (15.94)	355 (13.976)	320 (12.598)	260 (10.24)	45 (1.77)	1185 (46.65)	305 (12.01)	430 (16.93)	158 (6.22)	12

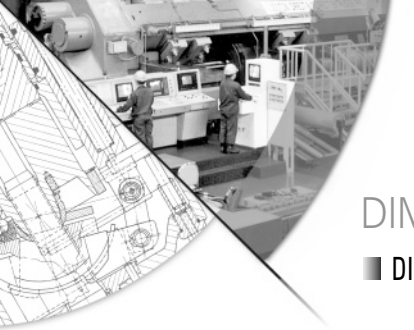


PV 100 - 250

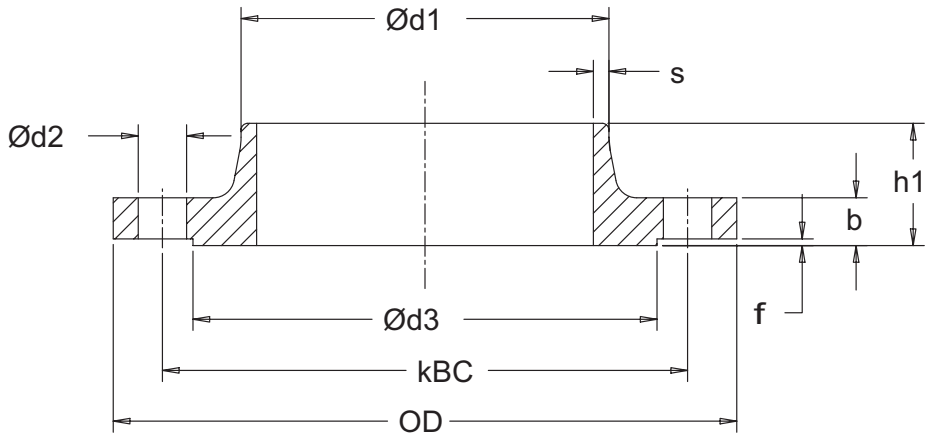


Mounting cavity details

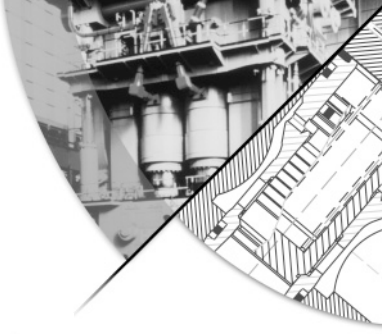
Size	ØD1 H7 mm (inch)	ØD2 $^{+0.1}_{+0.0039}$ mm (inch)	ØD3 min mm (inch)	D4 mm (inch)	D5 mm (inch)	T1 mm (inch)	T2 $^{+0.2}_{+0078}$ mm (inch)	T3 mm (inch)	T4 mm (inch)	T5 mm (inch)	N	Valve Mounting Screws S.H.C. Screw Size	Tightening Torque
100	200 (7.874)	191.6 (7.543)	180 (7.087)	M30 x 3.5	250 (9.843)	5 (0.197)	20 (0.787)	34 (1.339)	37 (1.457)	45 (1.772)	12	M30 x 2.0 120 L, 12 nos.	1200 Nm (885 ft - lb)
125	250 (9.843)	241.6 (9.512)	230 (9.055)	M36 x 4.0	310 (12.205)	5 (0.197)	20 (0.787)	34 (1.339)	37 (1.457)	55 (2.165)	12	M36 x 3.0 150 L, 12 nos.	2250 Nm (1660 ft - lb)
150	290 (11.417)	281.6 (11.087)	270 (10.630)	M36 x 4.0	350 (13.780)	5 (0.197)	20 (0.787)	34 (1.339)	37 (1.457)	55 (2.165)	15	M36 x 3.0 150 L, 15 nos.	2250 Nm (1660 ft - lb)
200	380 (14.961)	368.6 (14.512)	355 (13.976)	M42 x 4.5	445 (17.520)	8 (0.315)	28.5 (1.122)	42 (1.654)	56 (2.205)	60 (2.362)	18	M42 x 3.0 180 L, 18 nos.	4100 Nm (3025 ft - lb)
250	450 (17.717)	438.6 (17.268)	425 (16.732)	M42 x 4.5	525 (20.669)	8 (0.315)	28.5 (1.122)	42 (1.654)	57 (2.244)	75 (2.953)	24	M42 x 3.0 230 L, 24 nos.	4300 Nm (3179 ft - lb)



DIN 2633 Flange Data



Size mm (inch)	d1 mm (inch)	OD mm (inch)	b mm (inch)	kBC mm (inch)	h1 mm (inch)	s mm (inch)	d3 mm (inch)	f mm (inch)	d2 mm (inch)	N
NG 100 (4.00)	114.00 (4.50)	220 (8.66)	20 (0.78)	180 (7.09)	52 (2.05)	3.6 (0.14)	158 (6.22)	3 (0.12)	18 (0.71)	8
NG 125 (5.00)	140.00 (5.56)	250 (9.84)	22 (0.86)	210 (8.27)	55 (2.16)	4.0 (0.16)	188 (7.40)	3 (0.12)	18 (0.71)	8
NG 150 (6.00)	168.00 (6.62)	285 (11.22)	22 (0.86)	240 (9.45)	55 (2.17)	4.5 (0.18)	212 (8.35)	3 (0.12)	22 (0.87)	8
NG 200 (8.00)	219.00 (8.62)	340 (13.38)	24 (0.94)	295 (11.61)	62 (2.44)	5.9 (0.23)	268 (10.55)	3 (0.12)	22 (0.87)	12
NG 250 (10.00)	273.00 (10.75)	405 (15.94)	26 (1.02)	355 (13.98)	70 (2.75)	6.3 (0.25)	320 (12.59)	3 (0.12)	26 (1.02)	12

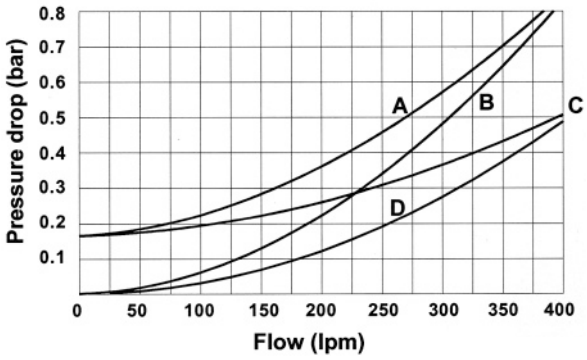


PERFORMANCE CURVES

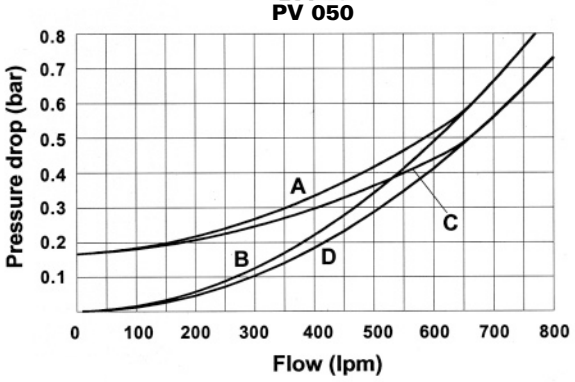
PV 040 - 080

Expected Performance Curves

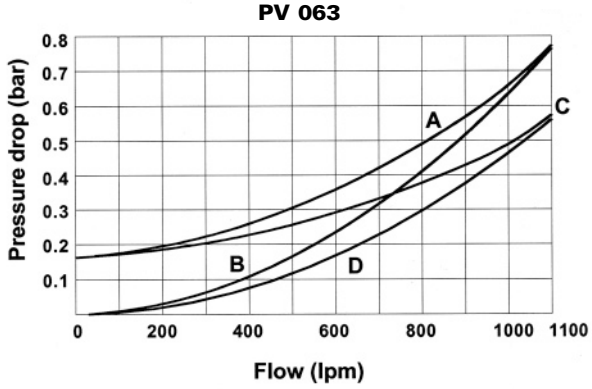
PV 040



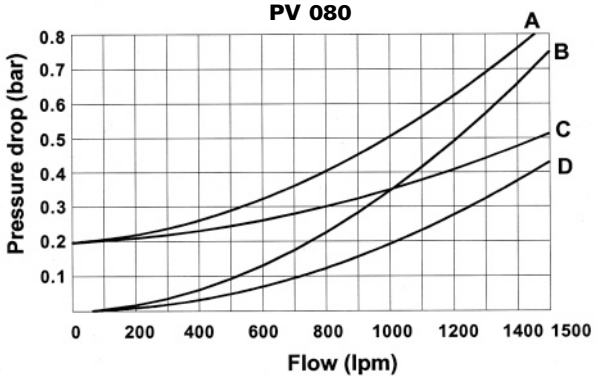
PV 050



PV 063



PV 080

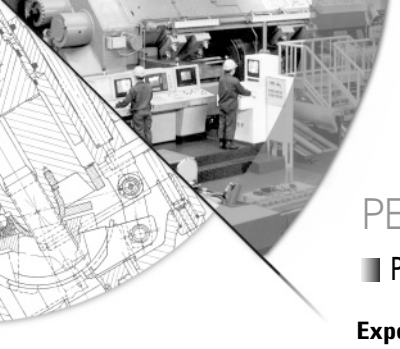


A - Flange mount (Flow A to B)

B - Flange mount (Flow B to A)
Piloted open

C - Tank mount (Flow A to B)

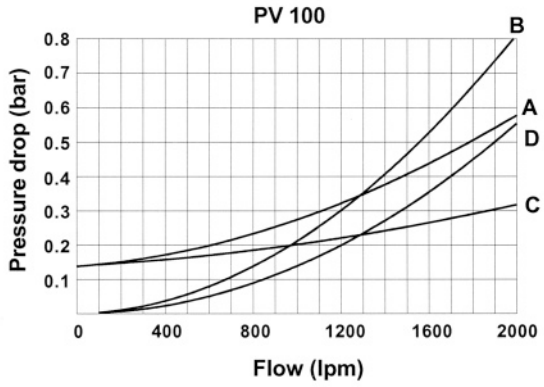
D - Tank mount (Flow B to A)
Piloted open

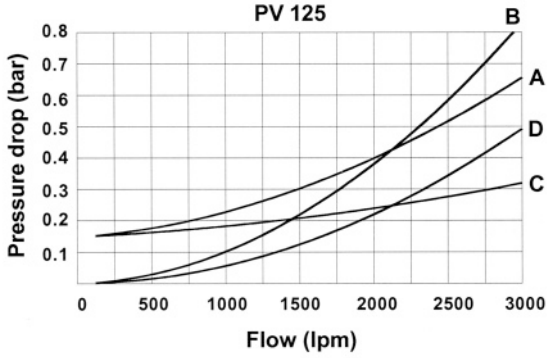


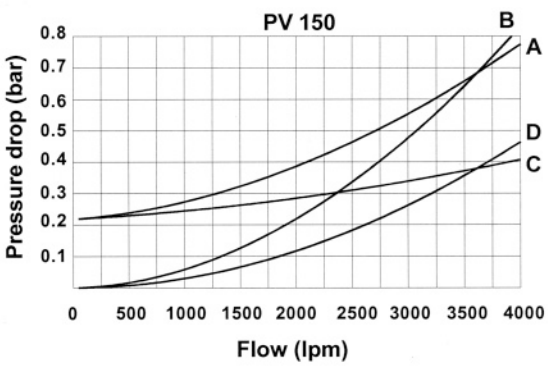
PERFORMANCE CURVES

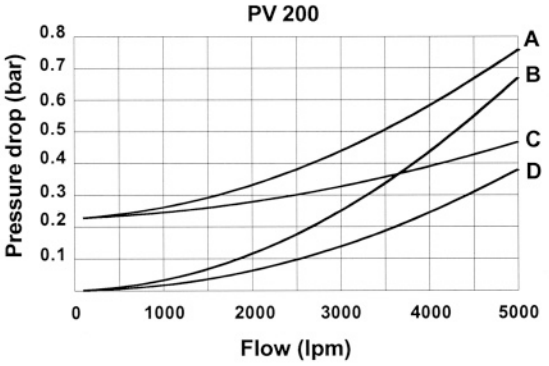
PV 100-250

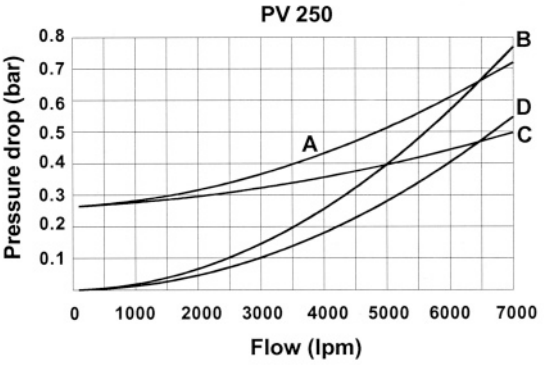
Expected Performance Curves









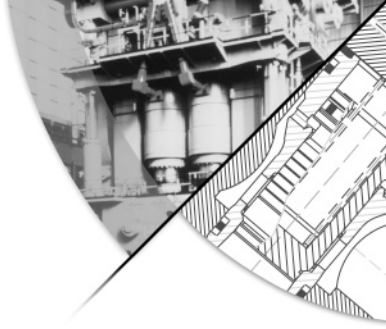


A - Flange mount (Flow A to B)

B - Flange mount (Flow B to A)
Piloted open

C - Tank mount (Flow A to B)

D - Tank mount (Flow B to A)
Piloted open



HOW TO ORDER

BLOCK NUMBER EXPLANATION	1	2	3	4	5	6	7	–	8
PREFILL & EXHAUST VALVE EXAMPLE	PV	063	A	1	N	U	M	–	10

1 = UNIT
PV = Cylinder Prefill and Exhaust Valve

2 = UNIT SIZE (Nominal Size)
040 = 40 mm
050 = 50 mm
063 = 63 mm
080 = 80 mm
100 = 100 mm
125 = 125 mm
150 = 150 mm
200 = 200 mm
250 = 250 mm

3 = MOUNTING STYLE
A = Flange port at A
B = For mounting inside reservoir

4 = PILOT OPERATION
0 = With Decompression
1 = With Decompression

5 = SEALS
N = Nitrile
V = Viton

6 = PILOT PORT
U = For SAE ports
G = BSP (G) ports

7 = MATING FLANGE
M = With SAE code 61
Flange and fasteners
N = None (Without)

8 = DESIGN CODE (Subject to change)
10 = PV 040 – 080
12 = PV 100 – 250

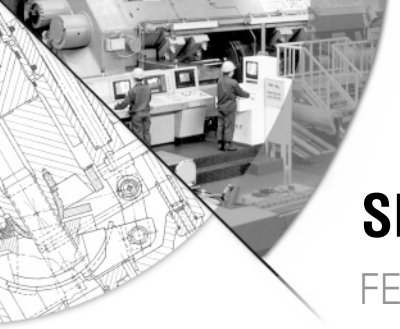
CROSS REFERENCE GUIDE – Conversions & Ports for PV Valves

Metric Conversion

1 mm	=	0.039 in.
1 cm	=	0.39 in.
1 cm^2	=	0.16 $in.^2$
1 Bar	=	14.5 psi.
1 kg	=	2.2 lb.
1 N-m	=	8.85 in-lb.
1 liter	=	1.05 qt.
1 liter	=	0.26 us gal.

Valve Ports

G	=	BSPP (BSP)
G 1/4	=	#4 SAE
G 3/8	=	#6 SAE
G 1/2	=	#8 SAE
G 3/4	=	#12 SAE
G 1	=	#16 SAE

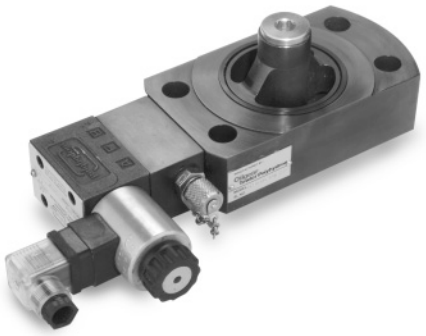


SPE 040 - 100 Cylinder Prefill and Exhaust Valves

FEATURES AND BENEFITS

2-way Seated Type

- Sandwich Type
- 040 to 100 mm (1.6 to 4 inch)
- Cylinder & straight line mount
- With or without integral decompression feature
- To 350 bar (5,076 psi) (refer to chart)
- Oil and Synthetic Fluids
- Water Base Fluids - consult factory



SPE 040 - 100 Type

Description

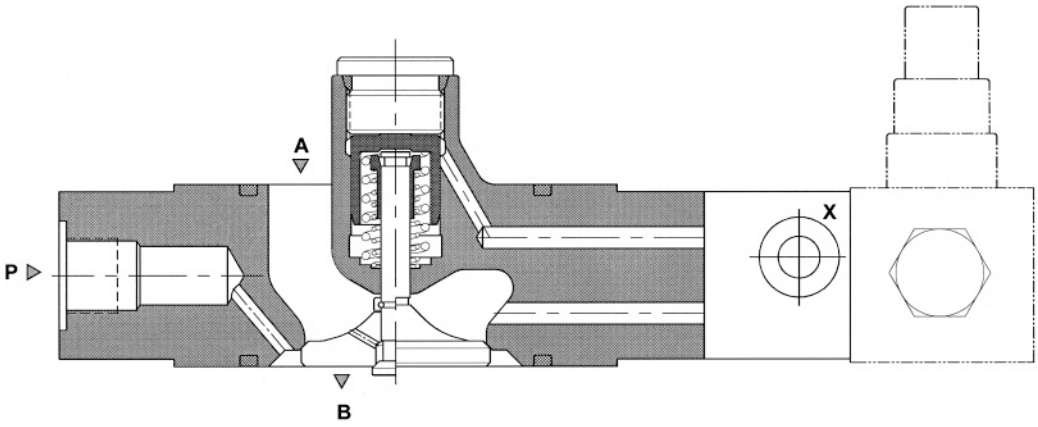
SPE valves are prefill and exhaust valves with seat type construction, providing free flow in one direction (A to B) while leak-free closure in the checked direction (B to A). Flow from B to A can be had by providing pilot pressure to Port X. These valves have an optional decompression feature, which allows it to open progressively, achieving rapid but smooth decompression. (To influence opening and closing times, throttle/check valve in the pilot line is recommended.)

Model without decompression

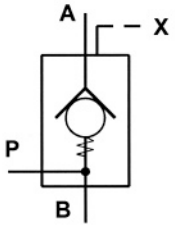
These valves allow free flow from Port A to Port B and require approximately 0.12 bar to open against bias spring. Flow from Port B to Port A is prevented by the leak-free closure of the main poppet against the seat. A pressure at Port X forces pilot piston to compress springs and lift main poppet from the seat. As main poppet opens, flow occurs from port B to Port A.

Model with decompression

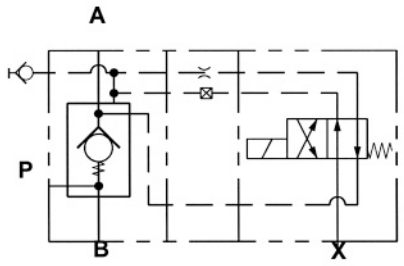
Functionally similar to that of the model without decompression except that, as pilot piston moves downward, pilot poppet opens first before engaging main poppet. This option permits smooth decompression of trapped volume of fluid in the actuator.



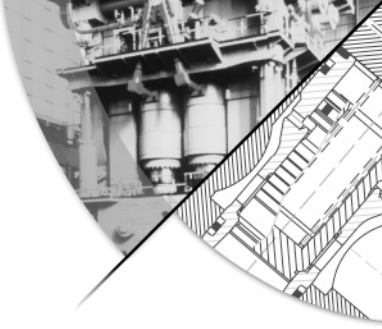
Hydraulic Symbols



SPE (with pilot port module)



SPED (with directional module)



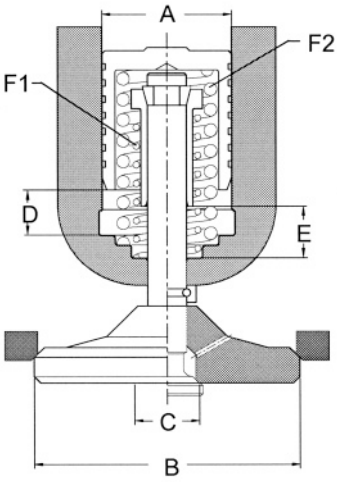
TECHNICAL DATA

SPE 040 - 100 Prefill Valves

Construction	Poppet type, Pilot operated
Mounting type	In-line, Sandwich style
Mounting position	Optional
Flow direction	Free flow from port “A” to port “B” Piloted flow from port “B” to port “A”
Operating pressure	Port “B” and “P” = 350 bar (5,076 psi) Port “X” = 150 bar (2,176 psi)
Cracking pressure	0.12 bar (1.7 psi)
Pilot Volume	Refer to chart
Flow handling capacity	Refer to graphs
Hydraulic medium	Mineral oil or synthetic Water base fluids – consult factory
Viscosity range	10 cSt to 380 cSt (59 to 1760 SUS)
Working temperature	-20º C to +70º C (-4º to 158º F)
Fluid cleanliness requirement	ISO 4406, 19/16/13 or better

SPECIFICATIONS

Effective areas at various sections



Size	A	B	C	D	E	F1	F2
SPE 040	3.1	13.2	0.8	0.7	0.8	0.10 to 0.22	2.96 to 5.24
SPE 050	4.7	19.6	1.1	0.85	1.35	0.10 to 0.23	3.16 to 5.66
SPE 063	7.1	31.2	1.8	1.4	1.45	0.11 to 0.20	2.91 to 4.97
SPE 080	10.2	49.0	2.8	1.4	1.6	0.12 to 0.26	3.05 to 5.79
SPE 100	15.9	73.9	3.5	1.85	2.15	0.11 to 0.26	2.99 to 6.07

A = Effective area, Pilot piston, in cm^2

B = Effective area, Main poppet, in cm^2

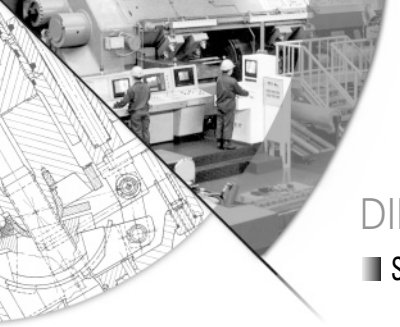
C = Effective area, Pilot poppet, in cm^2

D = Pilot piston stroke, in cm

E = Main poppet stroke, in cm

F1 = Valve spring force, in bar

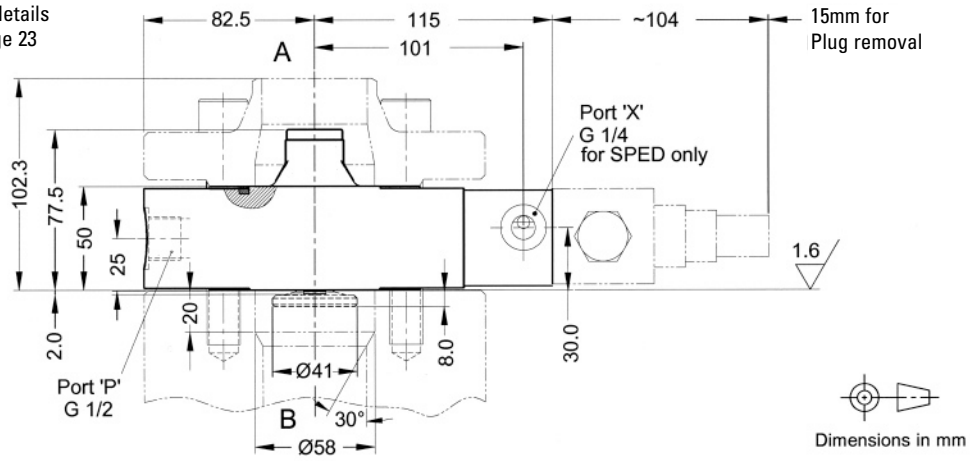
F2 = Pilot piston spring force, in bar

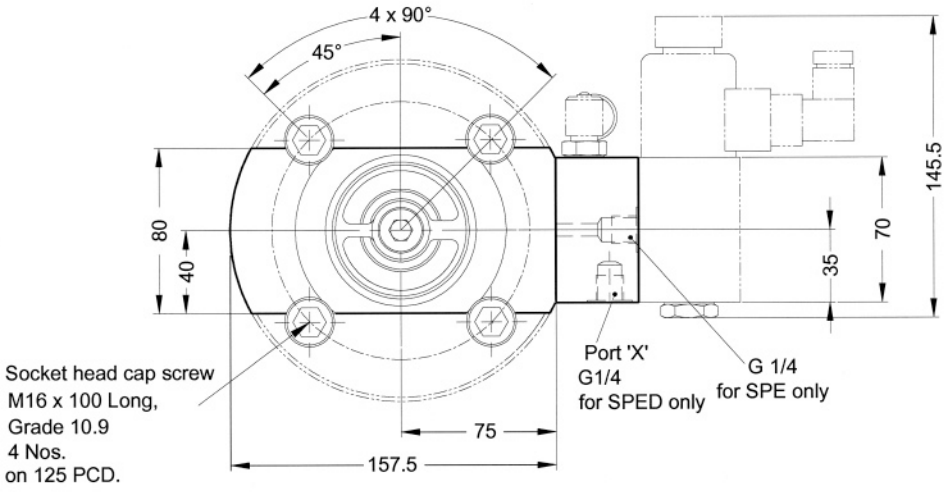


DIMENSIONS & WEIGHTS

SPE 040 NG

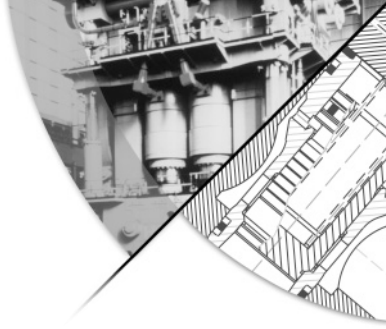
For flange details refer to page 23





General Information

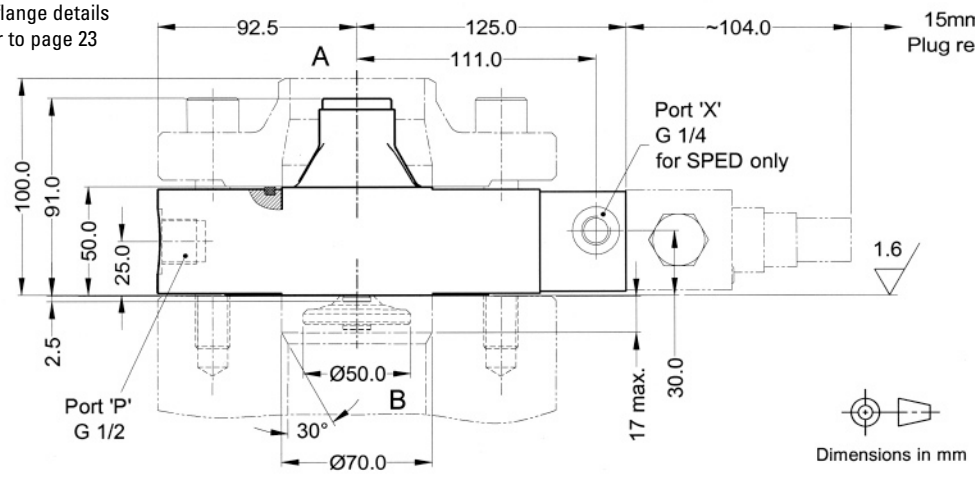
Weight	5.8 kg
Tightening Torque	310 N-m
A Port flange	4H 07225
B Port flange	4H 07144
R Ring Size	66.27 x 3.4 x 3.4

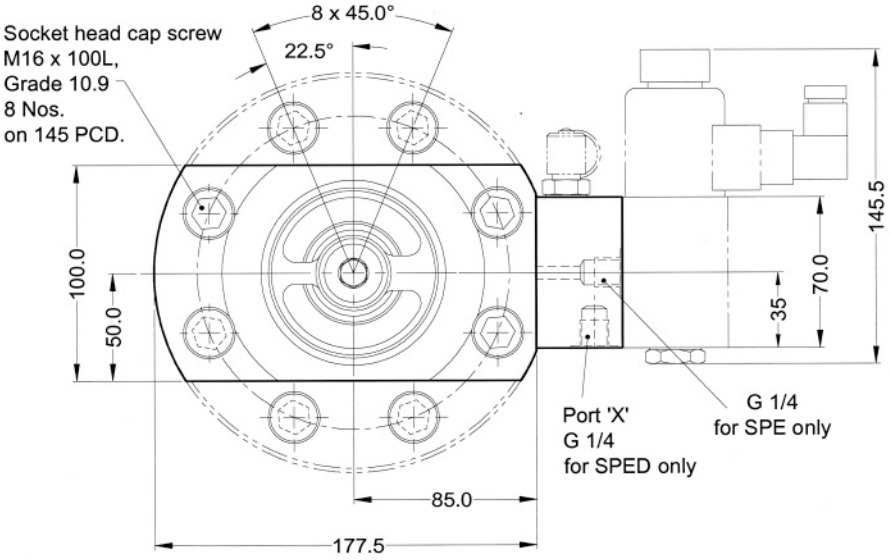


DIMENSIONS & WEIGHTS

SPE 050 NG

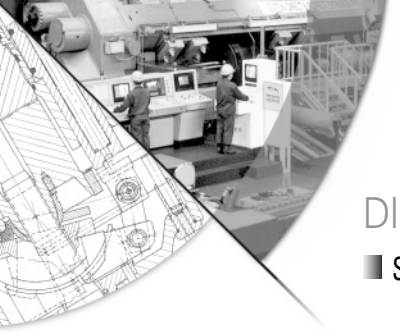
For flange details refer to page 23





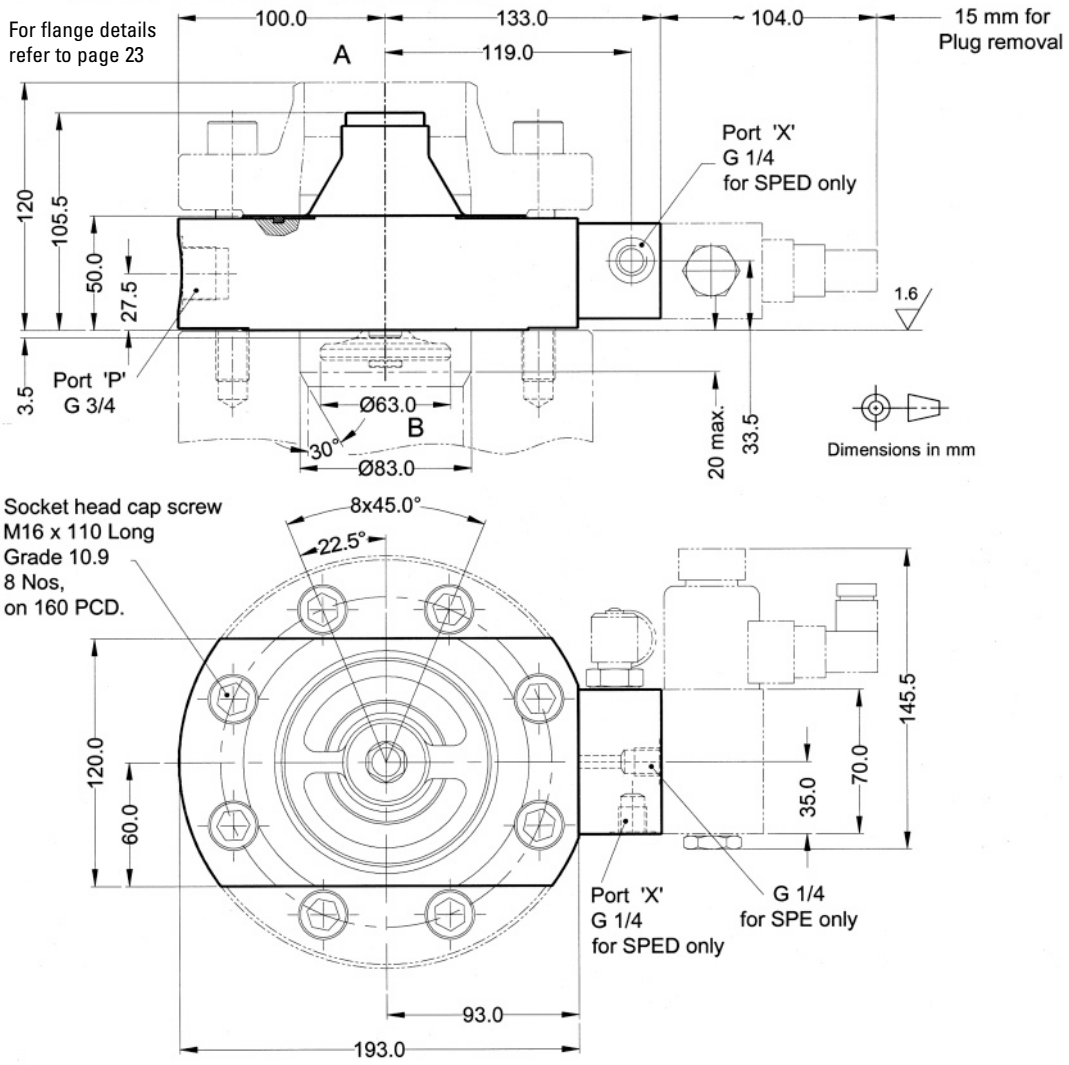
General Information

Weight	6.8 kg
Tightening Torque	310 N-m
A Port flange	4H 07226
B Port flange	4H 07145
R Ring Size	78.97 x 3.4 x 3.4



DIMENSIONS & WEIGHTS

SPE 063 NG



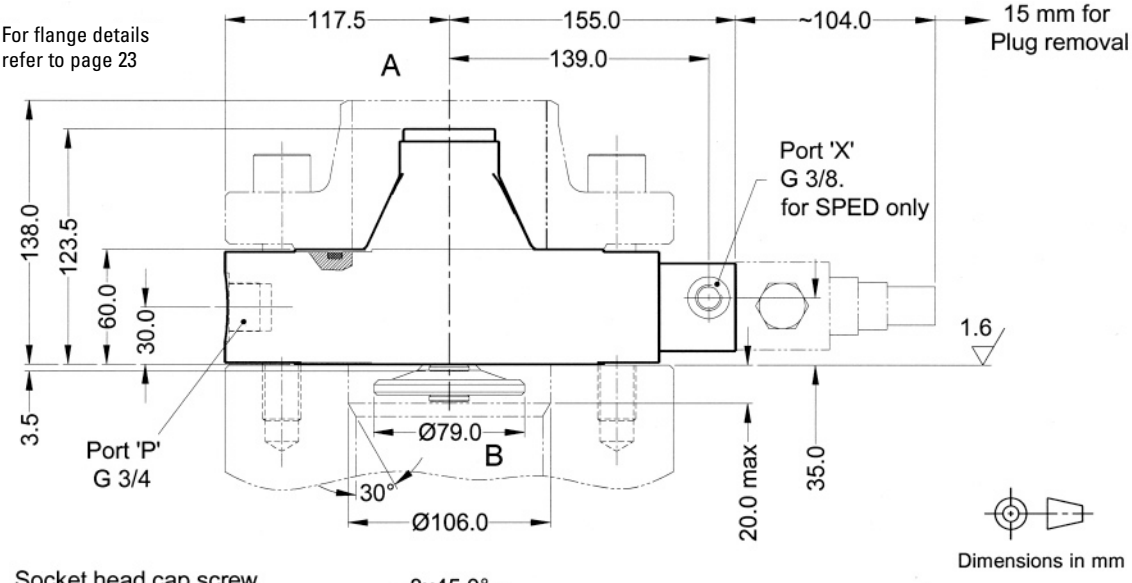
General Information

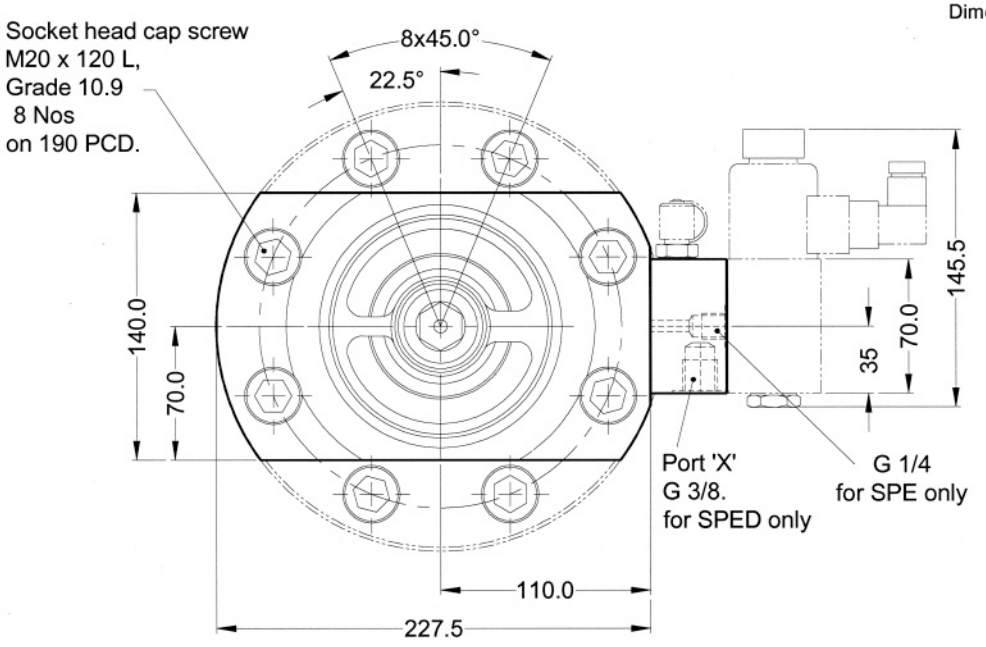
Weight	11.6 kg
Tightening Torque	310 N-m
A Port flange	4H 07227
B Port flange	4H 07146
R Ring Size	101.19 x 3.4 x 3.4

DIMENSIONS & WEIGHTS

SPE 080 NG

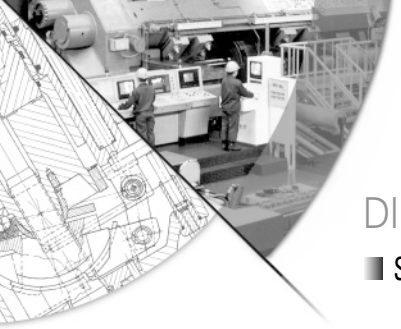
For flange details refer to page 23





General Information

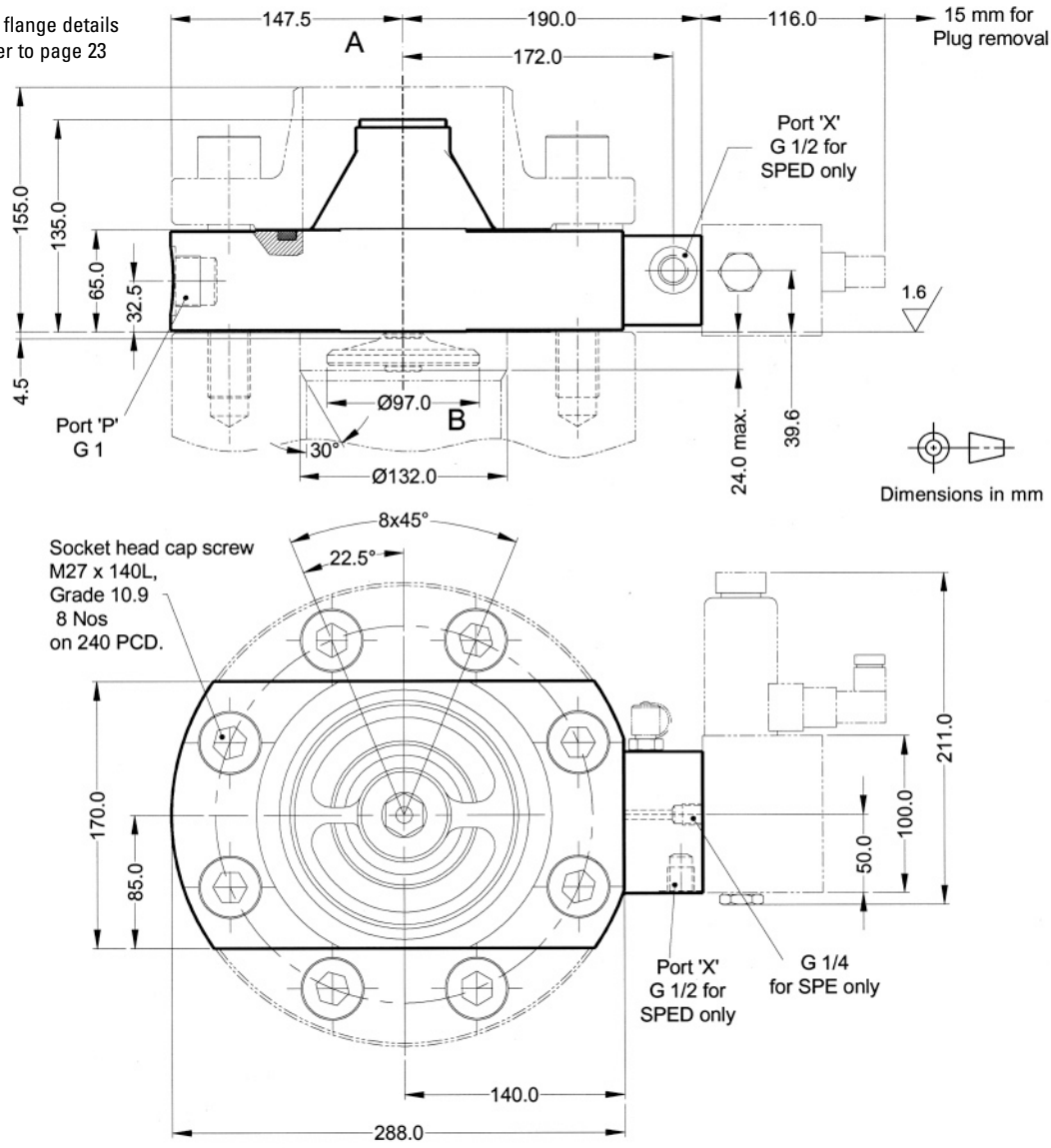
Weight	16.75 kg
Tightening Torque	620 N-m
A Port flange	4H 07228
B Port flange	4H 07147
R Ring Size	116.84 x 5.16 x 5.16



DIMENSIONS & WEIGHTS

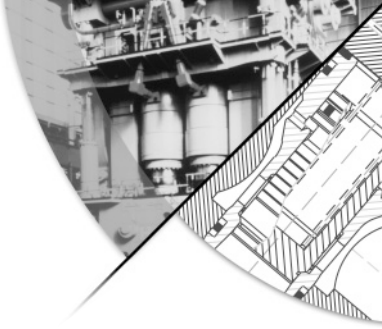
SPE 100 NG

For flange details refer to page 23



General Information

Weight	20.7 kg
Tightening Torque	1550 N-m
A Port flange	4H 07229
B Port flange	4H 07148
R Ring Size	145.42 x 6.73 x 6.73



"A" Port Flange

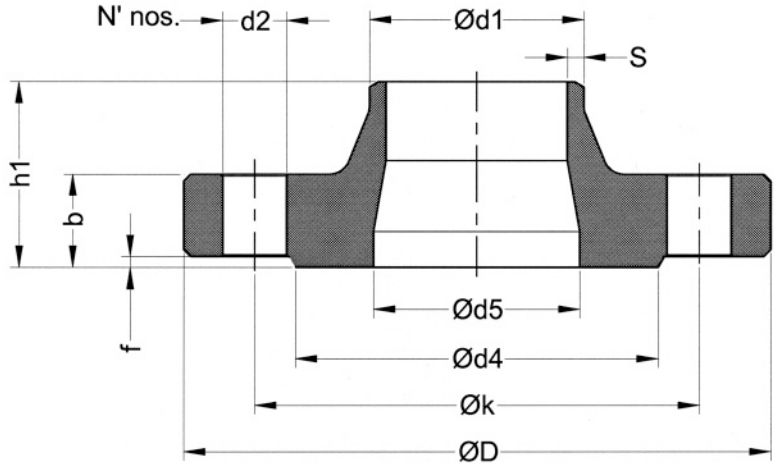
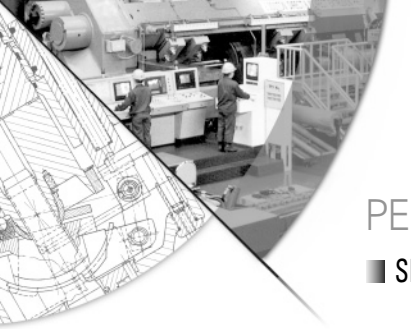


Table 1 Flange Data

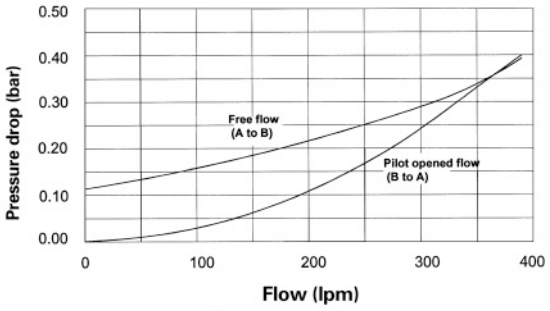
Size mm	d1	D	b	k	h1	s	d4	f	d2	d5	N	Weight kg
NG 040	60.3	165	26	125	52	4.65	102	3	18	58	4	3.6
NG 050	73.0	185	25	145	50	5.25	122	3	18	70	8	4.5
NG 063	88.9	200	30	160	65	5.45	136	3	18	86	8	5.0
NG 080	114.3	235	30	190	78	6.15	162	3	22	106	8	8.3
NG 100	141.3	295	32	240	90	6.60	188	3	30	130	8	16.5



PERFORMANCE CURVES

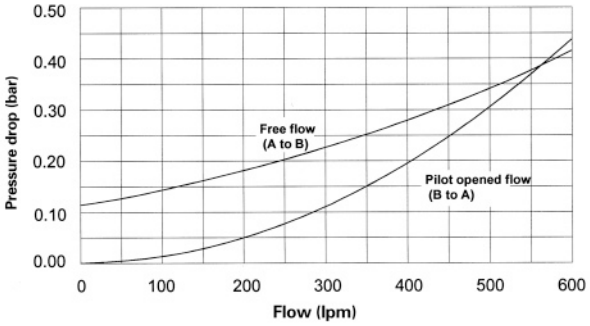
SPE 040 NG

Nominal flow handling capacity



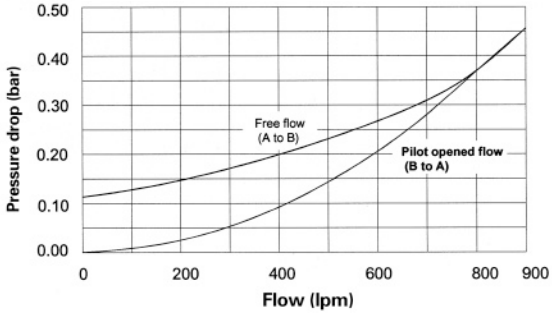
SPE 050 NG

Nominal flow handling capacity



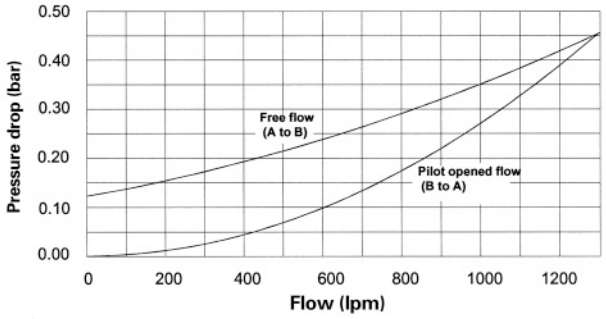
SPE 063 NG

Nominal flow handling capacity



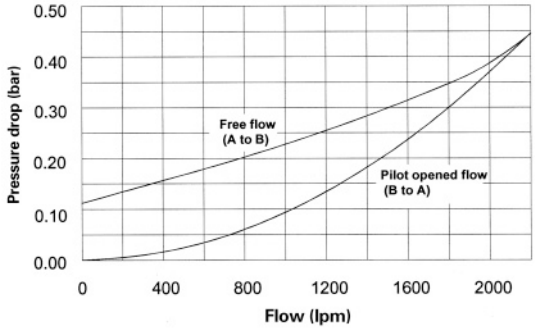
SPE 080 NG

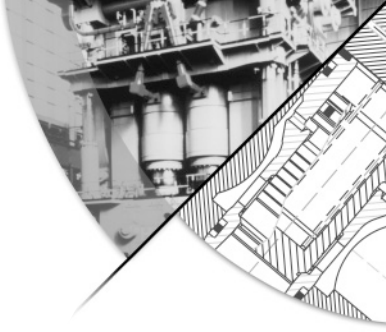
Nominal flow handling capacity



SPE 100 NG

Nominal flow handling capacity





HOW TO ORDER

BLOCK NUMBER EXPLANATION	1	2	3	4	–	5	6	7	–	8
PREFILL & EXHAUST VALVE EXAMPLE	SPE	D	050	D	–	1	A	N	–	1.0

1 = UNIT
SPE = Sandwich Prefill and Exhaust Valve

2 = MODULE
D = With Directional Module
Blank = With Pilot Port Module

3 = UNIT SIZE (Nominal Size)
040 = 40 mm
050 = 50 mm
063 = 63 mm
080 = 80 mm
100 = 100 mm

4 = MOUNTING STYLE
D = DIN type at port A
(see Table 1 on page 23)
N = None

5 = PILOT OPERATION
0 = With Decompression
1 = With Decompression

6 = CRACKING PRESSURE
A = 12 bar (175 psi)

7 = SEALS
N = Nitrile
V = Viton

8 = DESIGN CODE (SUBJECT TO CHANGE)
1.0 to 1.9 externally interchangeable

Note: Flange with or without fasteners sold separately.

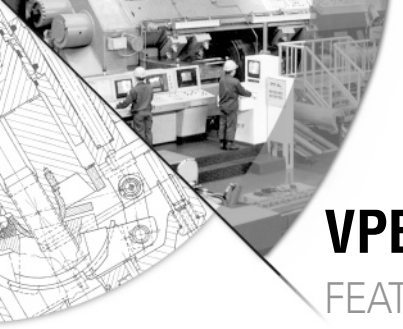
CROSS REFERENCE GUIDE – Conversions & Ports for SPE Valves

Metric Conversion

1 mm	=	0.039 in.
1 cm	=	0.39 in.
1 cm^2	=	0.16 $in.^2$
1 Bar	=	14.5 psi.
1 kg	=	2.2 lb.
1 N-m	=	8.85 in-lb.
1 liter	=	1.05 qt.
1 liter	=	0.26 us gal.

Valve Ports

G	=	BSPP (BSP)
G 1/4	=	#4 SAE
G 3/8	=	#6 SAE
G 1/2	=	#8 SAE
G 3/4	=	#12 SAE
G 1	=	#16 SAE



VPE 040 - 450 Cylinder Prefill and Exhaust Valves

FEATURES AND BENEFITS

2-way Seated Type

- 040 to 450 mm (1.6 to 18 inch)
- Mounting Styles:
  - Cylinder & 90º line connection
  - Cylinder & straight line connection
  - Cylinder & Tank connection
- With or without integral decompression feature
- To 700 bar (10,150 psi) and 500 bar (7,200 psi) (refer to chart)
- Oil and Synthetic Fluids
- Water Base Fluids - consult factory

Valve Function

Prefilling

The valve is used to connect a cylinder to a gravity or low pressure fluid supply (tank) and allow the cylinder to be filled with fluid when the ram is being withdrawn from the cylinder by means other than the hydraulic fluid applied to the ram, and where the speed is greater than that which can be achieved by the system pump flow. After prefilling, the valve automatically closes. This prevents pump flow into the tank, so that cylinder movement can continue at a speed relevant to the pumped volume.

Exhaust

Open the valve, using the pilot piston after pressure in the cylinder has been decompressed to a level which will prevent shock, to allow large volumes of oil to be quickly returned to the tank without the need to pass through the rest of the system.

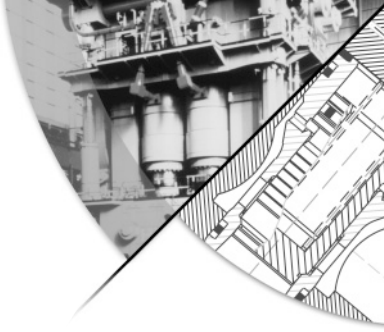
All Oilgear prefill valves are similar in design, construction and operation. Detail differences in construction are relative to the size of the valves. The valves can be simply described as consisting of three subassemblies. The main headed valve with seat and closing spring, the pilot assembly with return spring and the casing. Three styles of casing are used. The styles are all face mounting for the high pressure or cylinder connection, with the low pressure connection at 90° to the center line, in line or suitable for in tank mounting with the case directly open to tank.

The main headed valve is fitted with a spring to return the valve to its closed position. However, this spring is also designed to keep the pressure drop low in order to enable the valve to open naturally during the prefill cycle, and may not prevent flow to other or lower parts of the system from the tank.

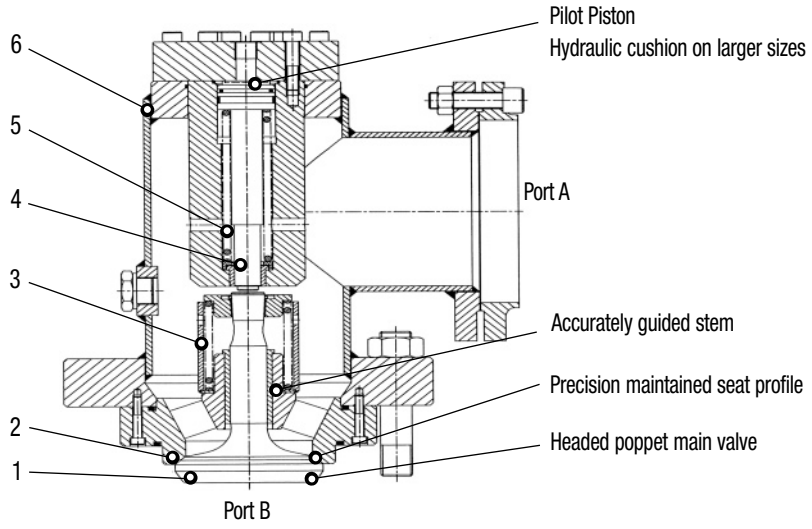
The operating piston which is used to open the valve during return is not connected to the main poppet, and can only push the valve open. This design allows a strong spring to be fitted to the pilot piston to drive the piston back to its normal position independently of the main poppet, thus giving positive action without influencing the low pressure drop characteristics of the valve. Unlike other valves where the main valve and pilot piston are connected, the timing of this return operation is not critical as the main poppet can remain naturally open when the pilot piston is retracted.

Some valves can be fitted with a proximity switch to indicate that the valve is closed. The switch can only be set to operate prior to closing position to ensure a position signal and is therefore not an absolute true indication of valve closed.

To suit individual requirements valves can be mounted in a customers' special housing or press head.



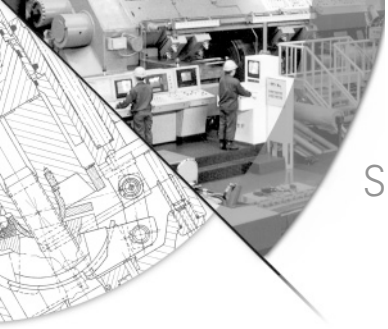
Valve Construction



The valve basically consists of – Main valve (1), Seat (2), Main spring (3), Pilot piston (4) Pilot spring (5) and Case (6)

Cylinder Prefilling
When the pressure at port B falls to create a differential across the valve (from port A to port B) which is sufficient to overcome the force in Main spring (3), the Main valve (1) will open allowing free flow from port A to port B.

Cylinder Exhaust
The pressure acting on port B holds the Main valve (1) on the Seat (2), keeping the valve closed. To allow flow in the return direction (from port B to port A) the pressure at port B must first be decompressed to a level which will not cause shocks in the system. Pressure can then be applied to port X, the pilot piston (4) is then forced down compressing the Pilot spring (5) and opening the Main valve (1) allowing exhaust flow from port B to port A.

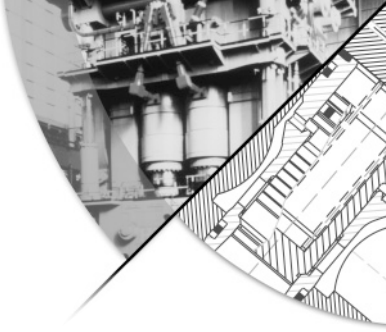


VPE Prefill Valve Flow Rating

			Mounting Style							
			CB Cylinder & 90°Line Connection		CL Cylinder & Straight Line Connection		CT Cylinder & Tank Connection	
	Size	Max Pressure bar (psi)	Rated Flow		Rated Flow		Rated Flow	
			Prefill lpm (gpm)	Exhaust lpm (gpm)	Prefill lpm (gpm)	Exhaust lpm (gpm)	Prefill lpm (gpm)	Exhaust lpm (gpm)
Small	040	700 (10,150)	255 (67)	600 (159)				
Small	050	700 (10,150)	450 (119)	1,050 (277)				
Small	065	500 (7,250)	700 (185)	1,645 (435)				
Small	090	500 (7,250)	1,400 (370)	3,200 (845)				
Medium	130	500 (7,250)	3,400 (898)	7,500 (1,981)	3,400 (898)	7,500 (1,981)	4,500 (1,189)	9,000 (2,378)
Medium	190	500 (7,250)	7,500 (1,981)	17,600 (4,649)	7,500 (1,981)	17,600 (4,649)	10,000 (2,642)	20,000 (5,283)
Medium	250	500 (7,250)	11,900 (3,144)	30,500 (8,057)	11,900 (3,144)	35,000 (8,057)	16,000 (4,227)	32,000 (8,454)
Medium	300	500 (7,250)	20,000 (5,283)	45,000 (11,888)	20,000 (5,283)	45,000 (11,888)	26,000 (6,868)	52,000 (13,737)
Large	350	500 (7,250)	26,000 (6,868)	65,000 (17,171)				
Large	400	500 (7,250)	34,000 (8,892)	85,000 (22,455)				
Large	450	500 (7,250)	40,000 (10,567)	100,000 (26,417)				

VPE Control Specifications

Valve Size		Stroke		Pilot Area		Volume to Open		Area Ratio	Spring Pressure	
	Mounting	in.	mm.	in^2	mm^2	in^3	cm^3		psi	bar
040	CB	0.69	17.6	1.53	957.0	1.03	16.8	1	50	3.4
050	CB	0.69	17.6	1.53	957.0	1.03	16.8	1.63	54	3.7
065	CB	0.69	17.6	1.53	957.0	1.03	16.8	2.1	52	3.6
090	CL & CT	0.97	24.7	1.53	957.0	1.44	23.6	5.6	70	4.83
090	CB	0.99	25.0	1.53	957.0	1.46	23.9	5.6	70	4.83
130	CL & CB	1.62	41.0	3.8	2376.8	5.94	97.5	6	90	6.2
130	CT	1.58	40.0	3.8	2376.8	5.80	95.1	6	90	6.2
190	all	1.77	45.0	13.8	5028.6	13.80	226.3	6	58	4
250	all	2.76	70.0	24.24	5676.8	24.24	397.4	7.8	73	5
300	all	2.76	70.0	24.24	5676.8	24.24	397.4	10.3	73	5



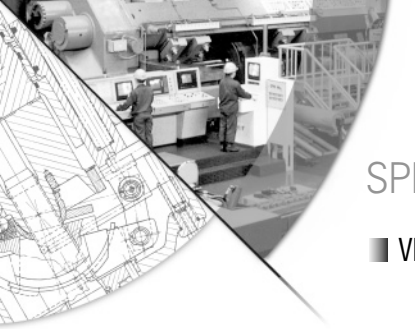
SPECIFICATIONS

VPE 040 - 090

Valve Size			040	050	065	090
Max Flow Prefilling (Tank to cylinder) 1/min			255	450	700	1,400
Max Flow Exhaust (Cylinder to tank) 1/min			600	1,050	1,645	3,200
Maximum Pressure	Cylinder, bar		700	500	500	500
	Tank standard valve, bar		15	15	15	15
	Pilot connection, bar		310	310	310	310
Pressure required to open valve (P = cylinder pressure)			P + 3,4 + tank	1,63P + 3,7 + tank	2,1P + 3,6 + tank	5,6P + 4,8 + tank
Ratio main valve to pilot piston			1:1	1,63:1	2,1:1	5,6:1
Volume, pilot piston full stroke cm^3			17	17	17	17
Fluid	Viscosity	1 to 200 cSt				
	Mineral Oil	ISO 6743/4 type HM or HV				
	Fire Resistant Fluids	HFDR	Phosphate Ester			
		HFC	Water Glycol			
		HFAt	High water based, thickened norminally 46 cSt			
		HFAs	98% or 95% water, Oilgear manufactures a complete range of equipment to handle these fluids. Some may need special materials. Consult Oilgear for information.			
	Cleanliness	Filters should be provided in the system to maintain the fluid cleaner than ISO 4406 Code 18/13/11 (NAS 1638 7)				

VPE 130-300

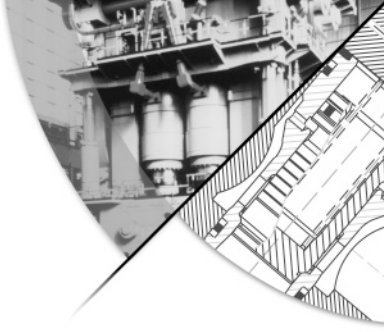
Valve Size			130	190	250	300
Max Flow Prefilling (Tank to cylinder) 1/min. CB, CL			3,400	7,500	11,900	20,000
Max Flow Prefilling (Tank to cylinder) 1/min CT			4,500	10,000	16,000	26,000
Max Flow Exhaust (Cylinder to tank) 1/min CB, CL			7,500	17,600	30,500	45,000
Max Flow Exhaust (Cylinder to tank) 1/min CT			9,000	20,000	32,000	52,000
Maximum Pressure	Cylinder, bar		500	500	500	500
	Tank standard valve, bar		3,5	3,5	3,5	3,5
	Pilot connection, bar		500	500	500	500
Pressure required to open valve (P = cylinder pressure)			6P + 6,2 + tank	6P + 4 + tank	7,8P + 5 + tank	10,3P + 5+ + tank
Ratio main valve to pilot piston			6:1	6:1	7.8:1	10,3:1
Volume, pilot piston full stroke cm^3			97.5	226	506	506
Fluid	Viscosity	1 to 200 cSt				
	Mineral Oil	ISO 6743/4 type HM or HV				
		HFDR	Phosphate Ester			
		HFC	Water Glycol			
		HFAt	High water based, thickened norminally 46 cSt			
	Fire Resistant Fluids	HFAs	98% or 95% water, Oilgear manufactures a complete range of equipment to handle these fluids. Some may need special materials. Consult Oilgear for information.			
	Cleanliness	Filters should be provided in the system to maintain the fluid cleaner than ISO 4406 Code 18/13/11 (NAS 1638 7)				
Electrical switch if fitted		Voltage 24 to 250 AC or DC 4 Amp Rating				



SPECIFICATIONS

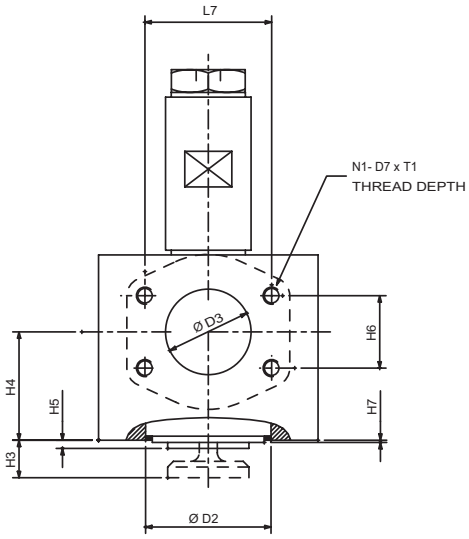
VPE 350 - 450

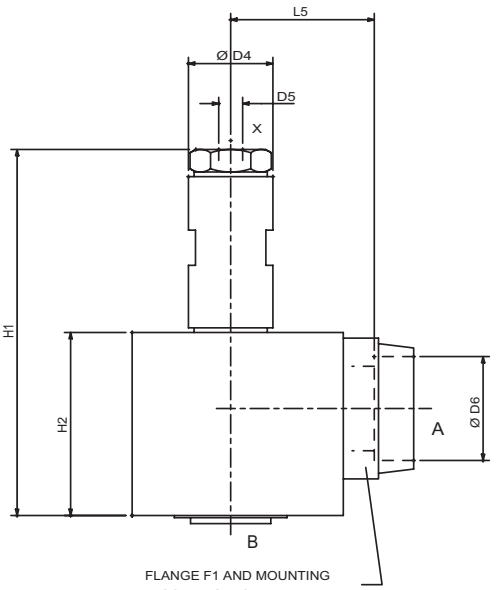
Valve Size				350	400	450
Max Flow Prefilling (Tank to cylinder) 1/min. 90° bend				26,000	34,000	37,000
Max Flow Exhaust (Cylinder to cylinder) 1/min 90° bend				65,000	85,000	100,000
Maximum Pressure	Cylinder, bar			350	350	350
	Tank standard valve, bar			3,5	3,5	3,5
	Pilot connections "X" & "Y", bar			350	350	350
Minimum operating pressure port "X", bar				10	10	10
Pressure required to open valve (P = cylinder pressure), bar				11P + 5	11P +5	11P +5
Ratio main valve to pilot piston (port "X" at pressure "Y" = 0)				11:1	11:1	11:1
Volume port "X" cm^3				785	1,195	1,860
Volume port "Y" cm^3				454	687	968
Fluid	Viscosity	1 to 200 cSt				
	Mineral Oil	ISO 6743/4 type HM or HV				
	Fire Resistant Fluids	HFDR	Phosphate Ester			
		HFC	Water Glycol			
		HFAt	High Water Based, Thickened Norminally 46 cSt			
		HFAs	98% or 95% water, Oilgear manufactures a complete range of equipment to handle these fluids. Some may need special materials. Consult Oilgear for information.			
	Cleanliness	Filters should be provided in the system to maintain a fluid cleaner than ISO 4406 Code 18/13/11 (NAS 1638 7)				
Electrical switch if fitted		Voltage 24 to 250 AC or DC 4 Amp rating				

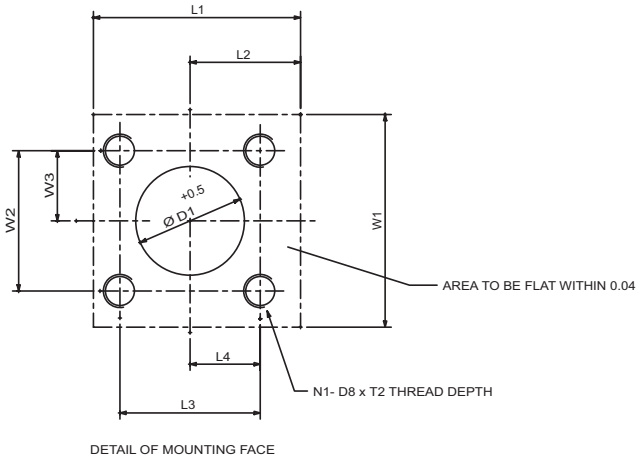


DIMENSIONS

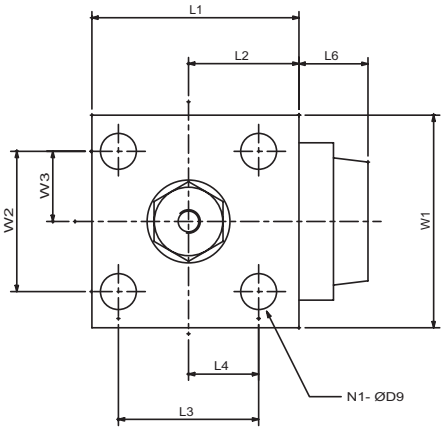
VPE 040 - 090





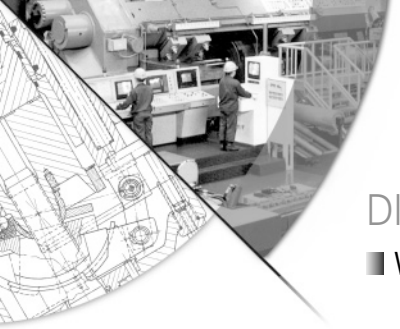


DETAIL OF MOUNTING FACE



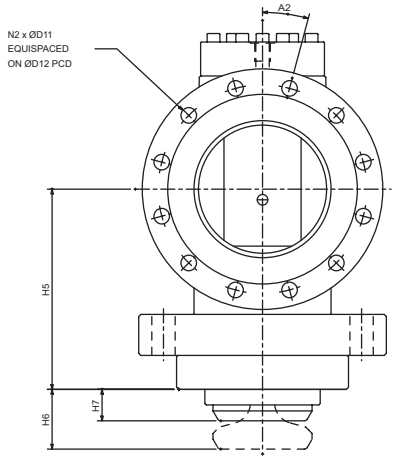
Size	D1	D2	D3	D4	D5	D6	D7	D8	D9	F1 SAE Code 61	H1	H2	H3	H4	H5	H6	H7	L1
040	50.1	57.2	38	60	3/8" BSP	48.3	M12	M20	22	1 1/2"	219	89	15	47.6	2.8	45.7	1.6	125
050	64.6	73	45	60	3/8" BSP	60.3	M12	M24	26	2"	230	100	18	57	4.6	42.9	1.5	150
065	78.7	86	60	60	3/8" BSP	76.2	M12	M24	26	2 1/2"	260	130	26.3	76	5.8	50.8	1.6	150
090	128.6	136	99	60	1/2" BSP	114.3	M16	M48	52	4"	300	185	58	100	24.3	77.8	22	250

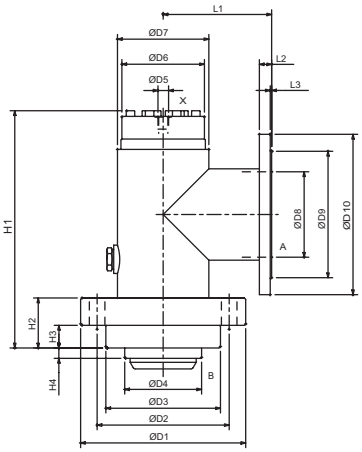
Size	L2	L3	L4	L5	L6	L7	N1	T1	T2	W1	W2	W3	Fastener	Qty.
040	75	66.6	33.3	100	44	70	4	23	35	102	66.6	33.3	M20 x 120 LG. S.H.C.S.	4
050	90	79.4	39.7	115	45	77.8	4	23	36	120	79.4	39.7	M24 x 130 LG. S.H.C.S.	4
065	80	101.6	50.8	105	50	89	4	25	36	154	101.6	50.8	M24 x 160 LG. S.H.C.S.	4
090	125	152.4	76.2	145	48	130	4	24	75	250	152.4	76.2	M48 Studs & Nuts	4

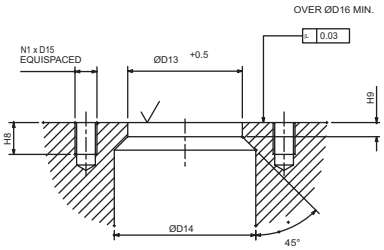


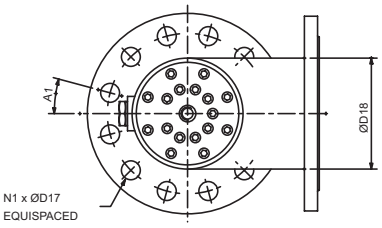
DIMENSIONS

VPE 130 - 300 "CB"



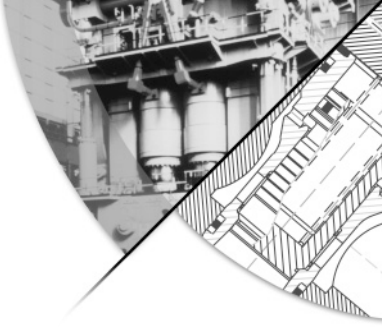






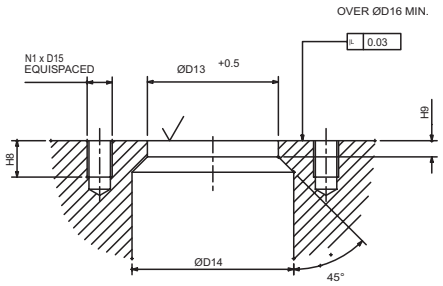
Size	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17
130	350	280	243	162	1/2" BSP	185	194	181	268	340	22	295	162	200	M30	245	33
190	490	400	350	240	1/2" BSP	220	273	225	320	405	26	355	240	270	M45	355	48
250	610	510	455	285	3/4" BSP	240	324	304	378	460	26	410	285	345	M48	460	52
300	700	585	520	362	3/4" BSP	260	407	381	490	580	30	525	362	440	M56	525	60

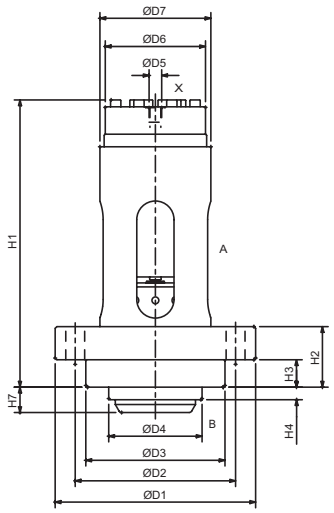
Size	D18	A1	A2	H1	H2	H3	H4	H5	H6	H7	H8	H9	L1	L2	L3	N1	N2
130	194	15º	15º	503	106	48	22	283	85	45	45	20	230	26	3	12	12
190	245	15º	15º	658	134	50	16	375	92	42	70	16	293	29	3	12	12
250	324	11.25º	15º	750	195	75	20	485	127	52	75	20	375	32	4	16	12
300	407	11.25º	11.25º	903	235	95	38	580	161	81	85	38	405	38	4	16	16

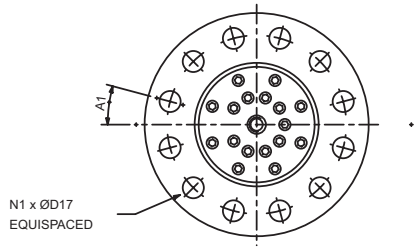


DIMENSIONS

VPE 130 - 300 "CT"

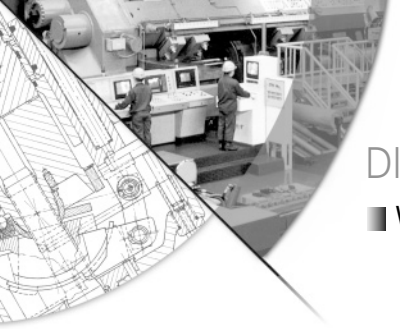






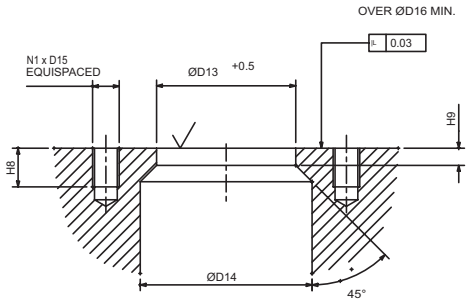
Size	D1	D2	D3	D4	D5	D6	D7	D13	D14	D15	D16	D17
130	350	280	243	162	1/2" BSP	185	194	162	200	M30	245	33
190	490	400	350	240	1/2" BSP	220	273	240	270	M45	355	48
250	610	510	455	285	3/4" BSP	240	324	285	345	M48	460	52
300	700	585	520	362	3/4" BSP	260	407	362	440	M56	525	60

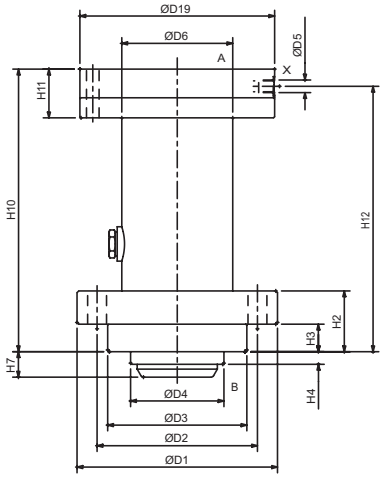
Size	A1	H1	H2	H3	H4	H7	H8	H9	N1
130	15°	503	106	48	22	45	45	20	12
190	15°	658	134	50	16	42	70	16	12
250	11.25°	750	195	75	20	52	75	20	16
300	11.25°	903	235	95	38	81	85	38	16

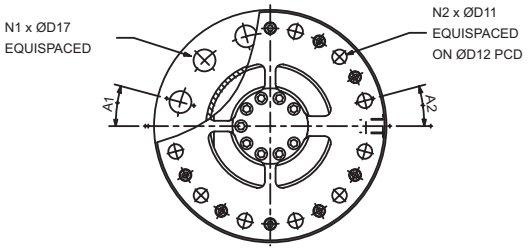


DIMENSIONS

VPE 130 - 300 "CL"

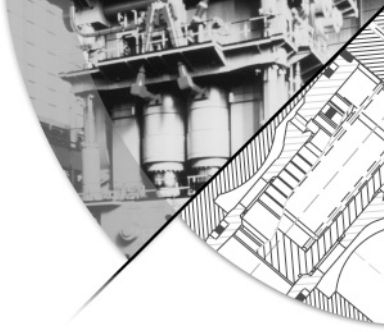






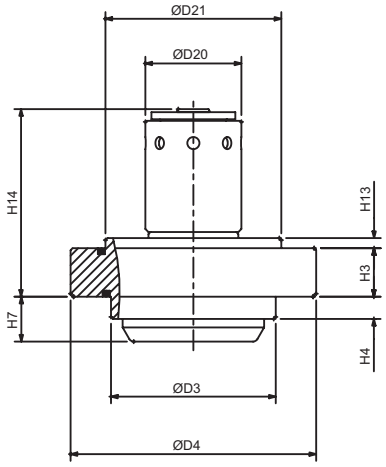
Size	D1	D2	D3	D4	D5	D6	D11	D12	D13	D14	D15	D16	D17	D19
130	350	280	243	162	1/2" BSP	185	22	295	162	200	M30	245	33	340
190	490	400	350	240	1/2" BSP	220	26	355	240	270	M45	355	48	405
250	610	510	455	285	3/4" BSP	240	26	410	285	345	M48	460	52	460
300	700	585	520	362	3/4" BSP	260	30	525	362	440	M56	525	60	580

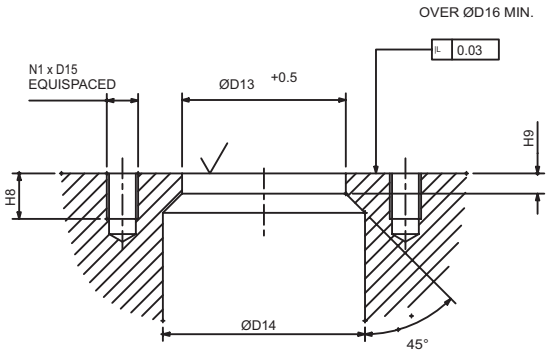
Size	A1	A2	H2	H3	H4	H7	H8	H9	H10	H11	H12	N1	N2
130	15°	15°	106	48	22	45	45	20	493	85	463	12	12
190	15°	15°	134	50	16	42	70	16	649	110	614	12	12
250	11.25°	15°	195	75	20	52	75	20	750	130	705	16	12
300	11.25°	11.25°	235	95	38	81	85	38	895	130	850	16	16



DIMENSIONS

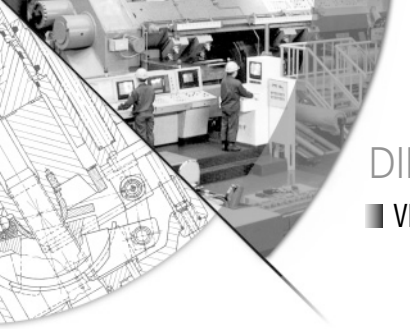
VPE 130 - 300 "CC"





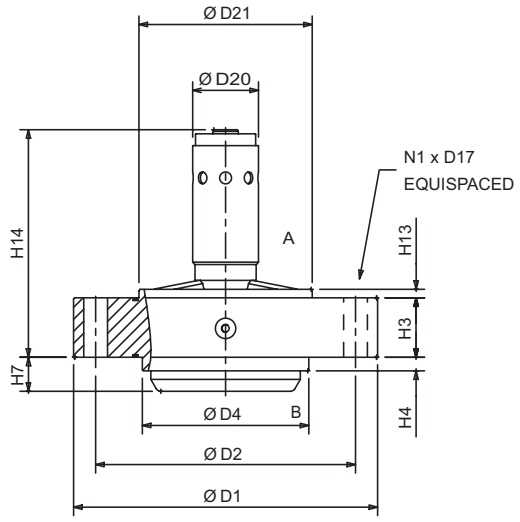
Size	D3	D4	D13	D14	D15	D16	D20	D21
130	243	162	162	200	M30	245	95	174
190	350	240	240	270	M45	355	114	240
250	455	285	285	345	M48	460	114	285
300	520	362	362	440	M56	525	140	362

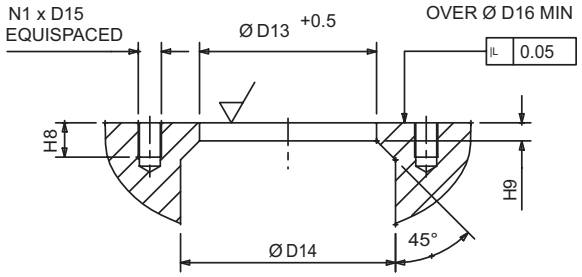
Size	H3	H4	H7	H8	H9	H13	H14	N1
130	48	22	45	45	20	38	186	12
190	50	16	42	70	16	25	295	12
250	75	20	52	75	20	20	336	16
300	95	38	81	85	38	15	469	16



DIMENSIONS

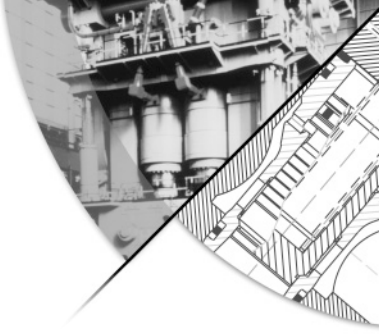
VPE 350 - 450 "CC"





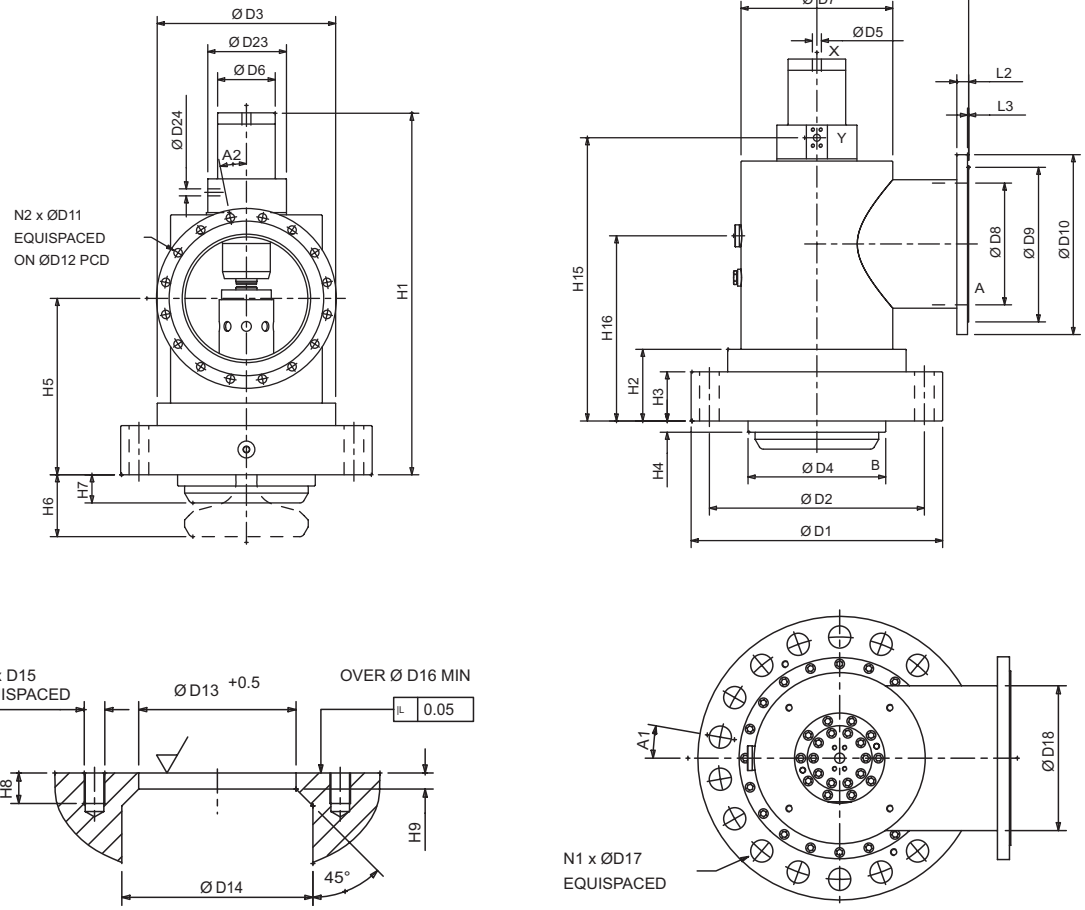
Size	D1	D2	D4	D13	D14	D15	D16	D17	D20
350	780	670	430	430	520	M56	785	61	170
400	895	765	490	490	595	M64	900	70	194
450	980	850	550	550	675	M64	985	70	229

Size	D21	H3	H4	H7	H8	H9	H13	H14	N1
350	455	150	35	88	85	40	20	595	18
400	510	175	40	100	100	50	25	670	18
450	580	210	40	105	100	50	20	795	20



DIMENSIONS

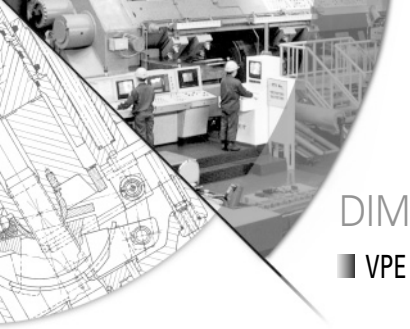
VPE 350 - 450 "CB"



Size	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
350	780	670	555	430	25	200	480	386	490	580	30	525	430
400	895	765	635	490	32	205	540	437	550	640	30	585	490
450	980	850	715	550	45	230	610	488	610	715	33	650	550

Size	D14	D15	D16	D17	D18	D23	D24	A1	A2	HI	H2	H3	H4
350	520	M56	785	61	406	260	25	10°	11.25°	1140	220	150	35
400	595	M64	900	70	457	285	25	10°	9°	1260	255	175	40
450	675	M64	985	70	508	310	32	9°	9°	1400	300	210	40

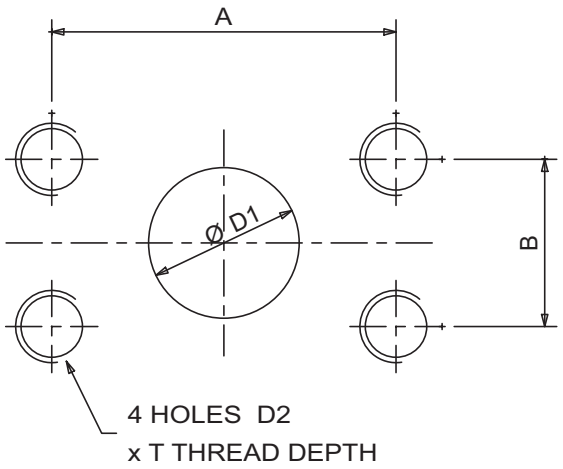
Size	H5	H6	H7	H8	H9	H15	H16	L1	L2	L3	N1	N2
350	560	193	88	85	40	874	586	480	38	4	18	16
400	630	220	100	100	50	980	659	540	42	4	18	20
450	690	250	105	100	50	1075	783	610	46	4	20	20



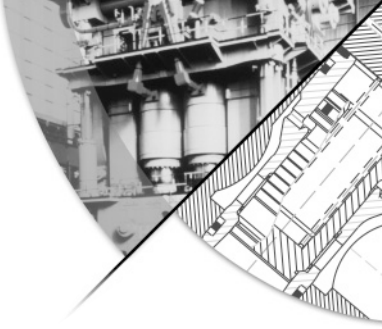
DIMENSIONS

VPE 350 - 450

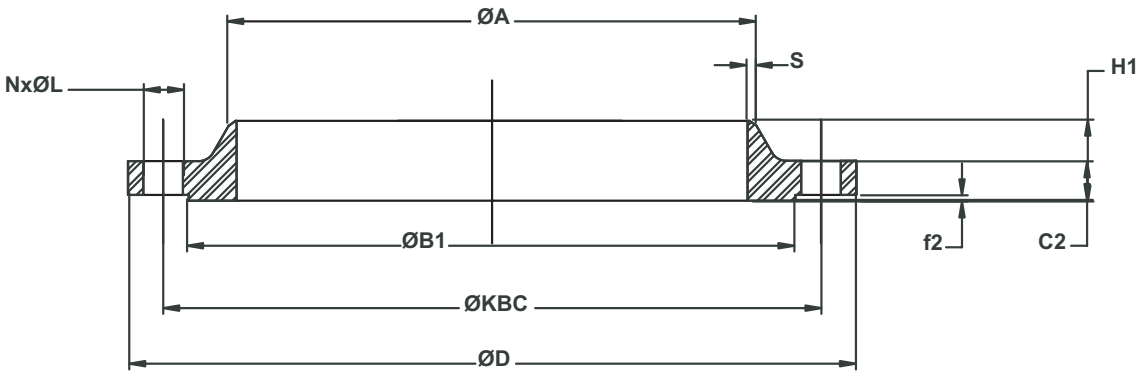
Size	Port X SAE code 62 (6000 psi)	Port Y SAE code 62 (6000 psi)
350	1"	1"
400	1-1/4"	1"
450	2"	1-1/4"



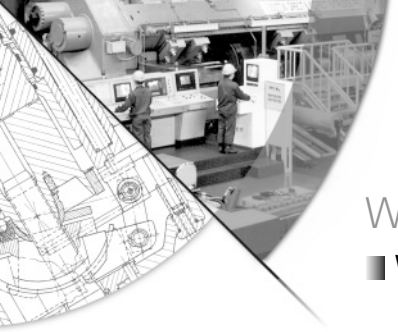
Port Size	A	B	D1	D2	T
1"	57.15	27.76	25	M12	22
1-1/4"	66.68	31.75	32	M14	22
2"	96.82	44.45	45	M20	32



BS 4504 Flange Data



Valve mm (inch)	Flange Size mm (inch)	D mm (inch)	K mm (inch)	L mm (inch)	N Qty	A mm (inch)	S mm (inch)	B1 mm (inch)	F2 mm (inch)	C2 mm (inch)	H1 mm (inch)
130 (5.00)	200 (8.00)	340 (13.38)	295 (11.62)	22 (0.87)	12	219.1 (8.63)	5.6 (0.22)	268 (10.55)	4.5 (0.18)	24 (0.94)	44 (1.73)
190 (7.50)	250 (10.00)	405 (15.94)	355 (13.98)	26 (1.02)	12	273.0 (10.75)	6.3 (0.25)	320 (12.60)	4.5 (0.18)	26 (1.02)	46 (1.81)
250 (10.0)	300 (12.00)	460 (18.12)	410 (16.14)	26 (1.02)	12	323.9 (12.75)	7.1 (0.28)	378 (14.88)	4.5 (0.18)	28 (1.10)	46 (1.81)
300 (12.00)	400 (16.00)	580 (22.83)	525 (20.67)	30 (1.18)	16	355.6 (14.00)	8.0 (0.32)	490 (19.29)	5 (0.20)	32 (1.26)	63 (2.48)
350 (14.00)	400 (16.00)	580 (22.83)	525 (20.67)	30 (1.18)	16	406.4 (16.00)	8.0 (0.32)	490 (19.29)	5 (0.20)	32 (1.26)	63 (2.48)
400 (18.00)	450 (18.00)	640 (25.19)	585 (23.03)	30 (1.18)	20	457.0 (18.00)	8.0 (0.32)	550 (21.65)	5 (0.20)	34 (1.34)	68 (2.68)
450 (18.00)	500 (20.00)	715 (28.15)	650 (25.59)	33 (1.30)	20	508 (20.00)	8.0 (0.32)	610 (24.02)	5 (0.20)	34 (1.34)	73 (2.87)



WEIGHTS

VPE 040 - 090

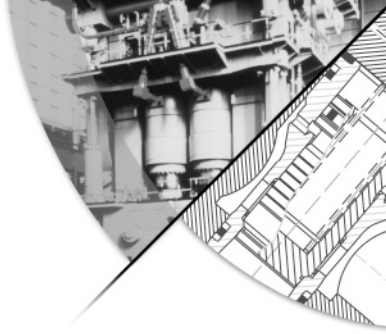
	Approximate Weight kg
Size	CB
040	9
050	16
065	33.5
090	58

VPE 130 - 300

	Approximate Weight kg			
Size	CB	CT	CL	CC
130	115	90	125	23
190	235	205	225	45
250	410	365	445	90
300	290	770	825	194

VPE 350 - 450

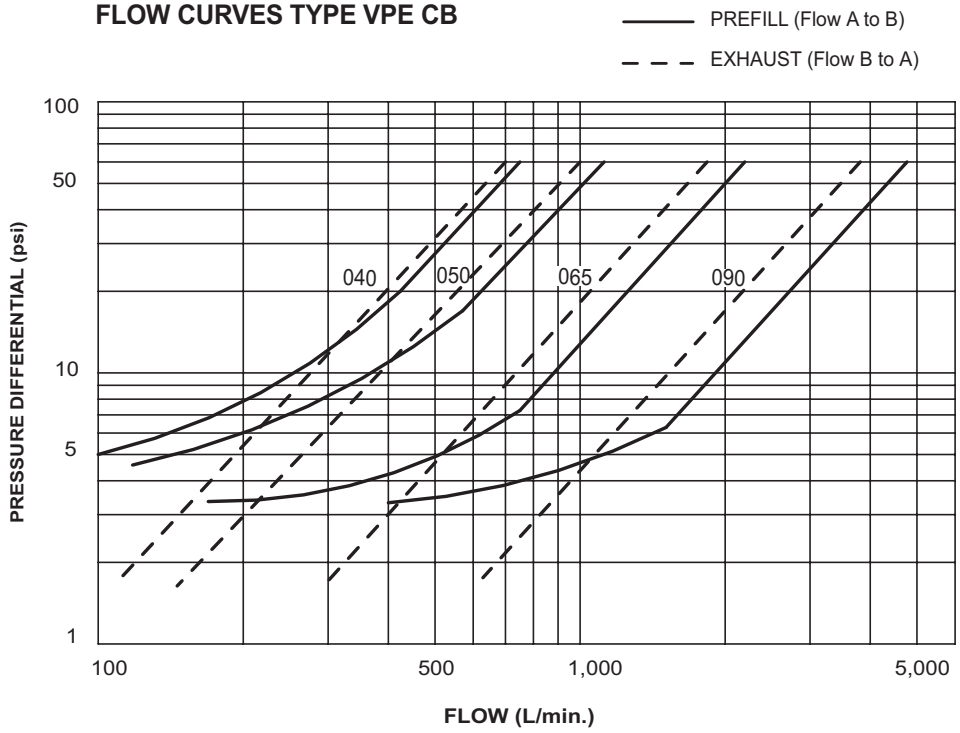
	Approximate Weight kg	
Size	CB	CC
350	880	125
400	1,278	815
450	1,885	1,164



PERFORMANCE CURVES

VPE 040 - 090

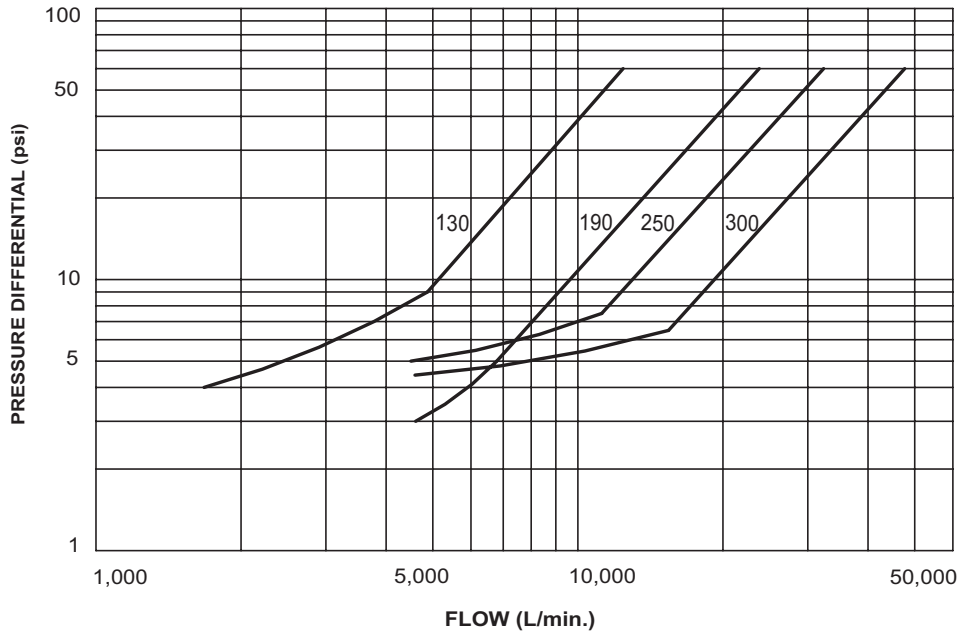
FLOW CURVES TYPE VPE CB



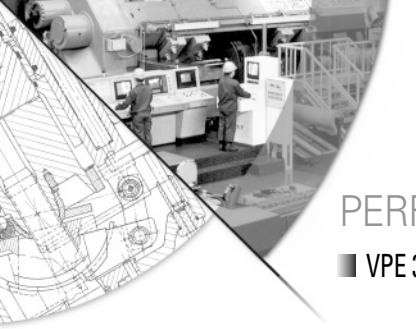
VPE 130 - 300

FLOW CURVES TYPE VPE CB

(Flow A to B Mounted horizontal)



The values of flow and pressure are for an oil with viscosity 40 cSt at 40°C

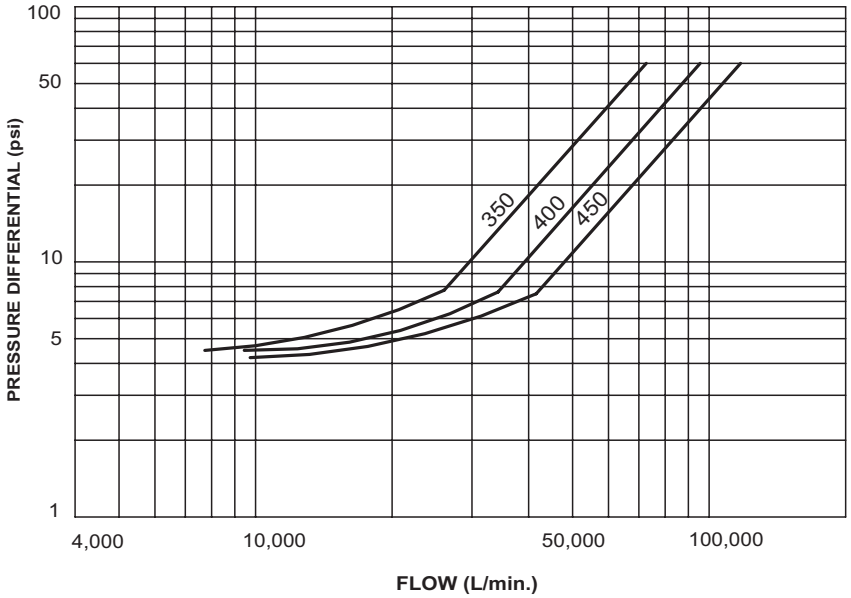


PERFORMANCE CURVES

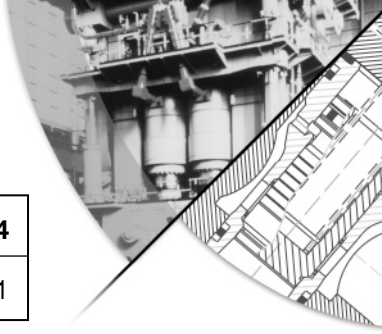
VPE 350 - 450

FLOW CURVES TYPE VPE CB

(Flow A to B mounted horizontal)



The values of flow and pressure are for an oil with viscosity 40 cSt at 40°C



HOW TO ORDER

BLOCK NUMBER EXPLANATION	1	2	3	4	5	–	6	7	8	9	10	11	12	13	14
PREFILL & EXHAUST VALVE EXAMPLE	VP	E	CB	050	B	–	70	A	M	B	HK	N	M	B	A1

1 = UNIT
VP = Cylinder Prefill and Exhaust Valve

2 = TYPE
E = Prefill and exhaust
P = Prefill only (w/o operating piston for exhaust opening)

3 = MOUNTING VARIATION
CB = Cylinder and Line Mounted with 90° bend
CL = Cylinder and Line Mounted - Straight
CT = Cylinder and In-Tank Mounting (only available for sizes 130 - 300)
CC = Prefill Only (for codes VPP, Sizes 130 - 450 only)

4 = UNIT SIZE (Nominal Size)
040 = 40 mm
050 = 50 mm
065 = 65 mm
090 = 90 mm
130 = 130 mm
190 = 190 mm
250 = 250 mm
300 = 300 mm
350 = 350 mm
400 = 400 mm
450 = 450 mm

5 = MOUNTING STYLE
B = Sizes 130 & 300
C = Sizes 190 & 250
N* = All sizes
*For code VPPCC only

6 = DESIGN PRESSURE
35 = 350 bar (5075 psi) sizes (only option for sizes 350 - 450)
50 = 500 bar (7250 psi) sizes (only option for 065 - 300)
70 = 700 bar (10150 psi) (only option for sizes 040 - 050)

7 = EXHAUST FLANGE (customer supplied)
A = All sizes code CB & CL
N = All sizes code CT & CC

8 = MATING FLANGES
M = Low Pressure Flange
Sizes 040 - 090
Includes SAE Code 61 Flange w/Fasteners
Sizes 130 - 450
Includes BS4504 PN 16 Code 112 Flange w/Fasteners
N = Without Mating Flange

9 = PILOT CONNECTION
B = For sizes 040 - 300
F = For sizes 350 - 450
N = For All VP CC Valves

10 = HK

11 = ADDITIONS
P = With Proximity Switch to Signal Valve Closed (sizes 130 - 450 only)
N = No Proximity Switch

12 = M

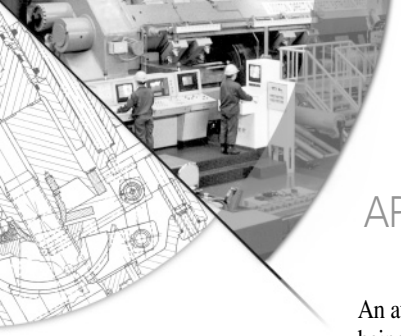
13 = SEALS
B = Buna-N (standard)
E = EPDM
V = Viton

14 = DESIGN SERIES (Subject to change)
A1

Note: Flange with or without fasteners sold separately.

Table 1 Flange Data

Valve mm (inch)	Flange Size mm (inch)	D mm (inch)	K mm (inch)	L mm (inch)	N Qty	A mm (inch)	S mm (inch)	B1 mm (inch)	F2 mm (inch)	C2 mm (inch)	H1 mm (inch)
130 (5.00)	200 (8.00)	340 (13.38)	295 (11.62)	22 (0.87)	12	219.1 (8.63)	5.6 (0.22)	268 (10.55)	4.5 (0.18)	24 (0.94)	44 (1.73)
190 (7.50)	250 (10.00)	405 (15.94)	355 (13.98)	26 (1.02)	12	273.0 (10.75)	6.3 (0.25)	320 (12.60)	4.5 (0.18)	26 (1.02)	46 (1.81)
250 (10.0)	300 (12.00)	460 (18.12)	410 (16.14)	26 (1.02)	12	323.9 (12.75)	7.1 (0.28)	378 (14.88)	4.5 (0.18)	28 (1.10)	46 (1.81)
300 (12.00)	400 (16.00)	580 (22.83)	525 (20.67)	30 (1.18)	16	355.6 (14.00)	8.0 (0.32)	490 (19.29)	5 (0.20)	32 (1.26)	63 (2.48)
350 (14.00)	400 (16.00)	580 (22.83)	525 (20.67)	30 (1.18)	16	406.4 (16.00)	8.0 (0.32)	490 (19.29)	5 (0.20)	32 (1.26)	63 (2.48)
400 (18.00)	450 (18.00)	640 (25.19)	585 (23.03)	30 (1.18)	20	457.0 (18.00)	8.0 (0.32)	550 (21.65)	5 (0.20)	34 (1.34)	68 (2.68)
450 (18.00)	500 (20.00)	715 (28.15)	650 (25.59)	33 (1.30)	20	508 (20.00)	8.0 (0.32)	610 (24.02)	5 (0.20)	34 (1.34)	73 (2.87)



APPLICATION GUIDE LINES

An atmospheric prefill valve functions on the basis of a vacuum being generated in the main cylinder. Pressure differential between the vacuum and atmospheric pressure causes fluid to flow into the cylinder. The maximum vacuum allowable in the cylinder during prefill is a function of several variables including the amount of air present in the fluid, machine cycle and cylinder seals exposed to the vacuum.

When applying prefill valve type VSA and VSM, which are open and closed by pilot cylinder, the timing of the opening and closing functions are critical. If the valve is not opened before movement starts or is closed before the cylinder stops moving, complete filling may not take place.

The VPE check type prefill is opened and closed by the cylinder to atmospheric pressure differential. It therefore takes care of the opening/closing timing automatically. Maximum discharge capacity is limited by pressure drop and prefill pipe flow dynamics. Excessive pressure drops in the prefill valve on return may generate a force large enough so that the return cylinders cannot achieve the return speed desired. Dynamic conditions in prefill return pipes involving length of prefill piping velocity, of return oil, acceleration and deceleration of the column can result in water hammer and extreme shock.

Due to the complexity in dealing with the variables referred to above, care should be exercised in the selection of a prefill valve.

For special installations or assistance in valve selections consult your Oilgear representative.

CALCULATIONS

- Refer to figures 1, 2, or 3. Determine head "H" (in feet) between ram and level of fluid in reservoir.
- Check the valve size selection by determining pressure in cylinder during prefill for the following:
  $P_{abs} = P_{atm} + P_H - P_V - P_L$.

Where:

See figures 1 or 2 or 3.
P_H = Pressure due to head = 0.37 psi/ft x "H" (assuming a fluid specific gravity of 0.87).

See the Pressure Drop vs Flow chart for the valve involved.
P_V = Pressure drop through the prefill valve.

See figure 1 through 3 with reference to the Line Head Loss vs Flow for the pipe size involved.

P_L = Pressure drop due to line loss and elbows.

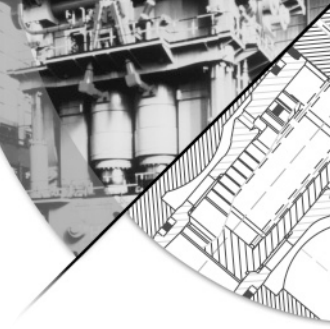
For special installation or assistance in valve selection, consult your Oilgear representative.

CONVERSIONS
PSI + 14.5 = bar
USGPM x 3.79 = liters/min.
Inches^2 x 645.16 mm^2
Inches^3 x 16.39 = cm^3
Feet/sec. x 0.305 = m/sec.

FLOW/VELOCITY IN SCHEDULE 40 PIPES

NOM. Pipe Size	Bore In.	4 fps US gpm	1,2 mps lpm	8 fps US gpm	2,4 mps lpm	12 fps US gpm	3,6 mps lpm	16 fps US gpm	4,8 mps lpm
3	3.07	92	344	184	688	276	1,032	368	1,376
4	4.03	159	593	317	1,186	476	1,780	635	2,372
6	6.06	360	1,341	720	2,682	1,080	4,023	1,441	5,365
8	7.98	624	2,325	1,247	4,650	1,871	6,977	2,495	9,303
10	10.02	983	3,666	1,966	7,333	2,949	11,000	3,933	14,666
12	11.94	1,396	5,206	2,791	10,413	4,187	15,620	5,582	20,827
14	13.12	1,687	6,286	3,373	12,574	5,060	18,860	6,747	25,148
16	15.00	2,203	8,217	4,406	16,435	6,609	24,653	8,812	32,870

	VALVE SIZE mm	PIPE TO RESERVOIR in.
VPE	040	1.5
	050	2
	065	2.5
	090	4
	130	7
	190	10
	250	12
	300	16
VSA	100	5
	150	8
	200	10
	250	12
VSM	075	3
	100	4
	150	6
	200	8
	250	10
	300	12
	350	16
	400	18



IN TANK MOUNTED P_L DOES NOT APPLY.

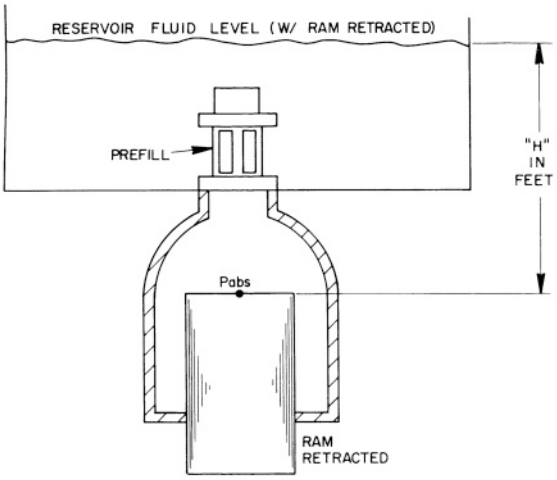
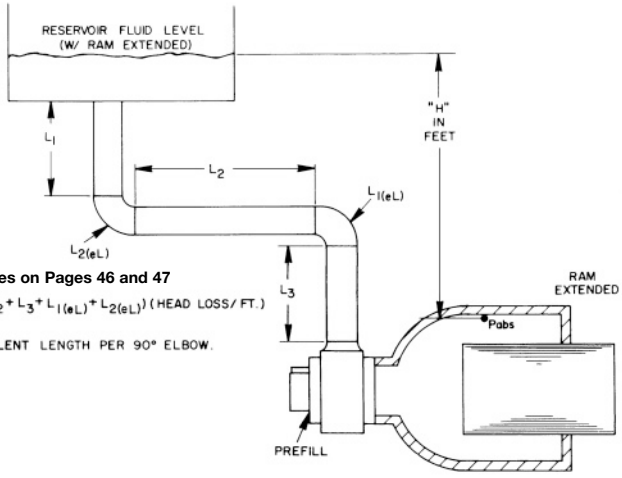


Fig. 1 Prefill installed in reservoir and directly connected to cylinder.



From Curves on Pages 46 and 47

$P_L = (L_1 + L_2 + L_3 + L_{1(eL)} + L_{2(eL)})$ (HEAD LOSS / FT.)

L = FEET

(eL) = EQUIVALENT LENGTH PER 90° ELBOW.

Fig. 2 Prefill mounted on cylinder and connected to bottom of reservoir.

From Curves on Pages 46 and 47

$P_L = (L_1 + L_2 + L_{1(eL)})$ (HEAD LOSS / FT.)

L = FEET

(eL) = EQUIVALENT LENGTH OF PIPE PER 90° ELBOW

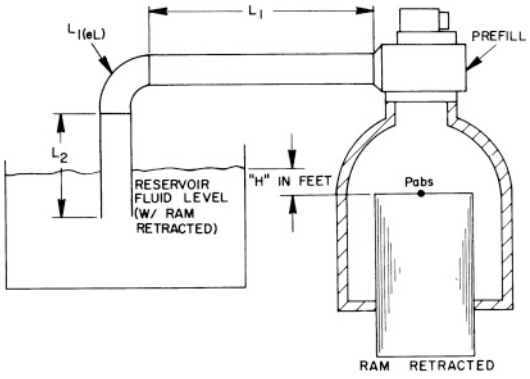
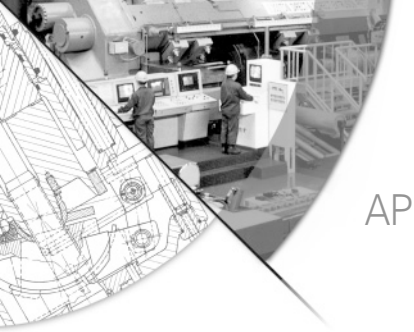
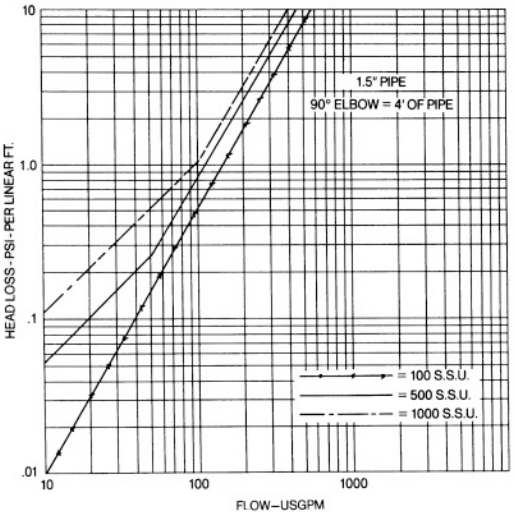


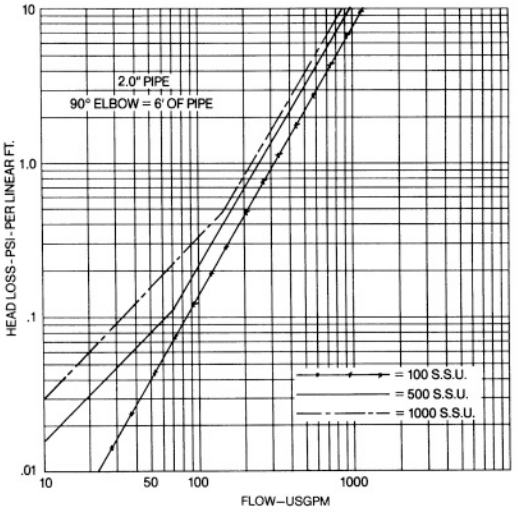
Fig. 3 Prefill mounted on cylinder and connected to top of reservoir.



1.5″ PIPE



2″ PIPE



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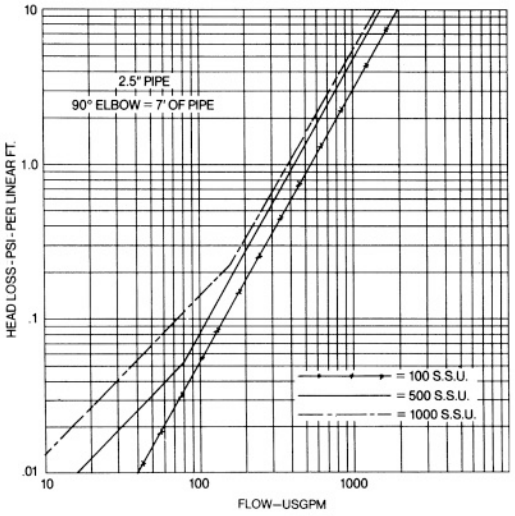

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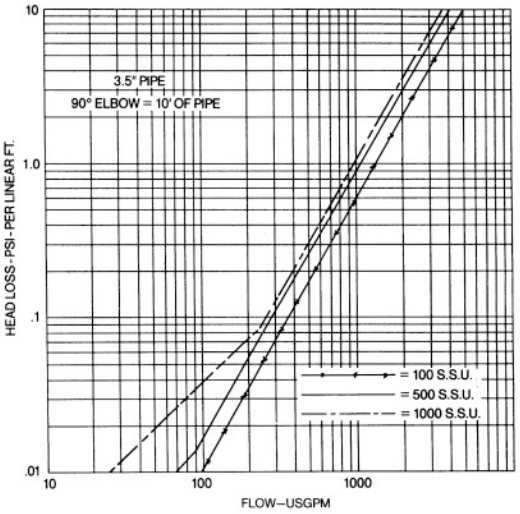

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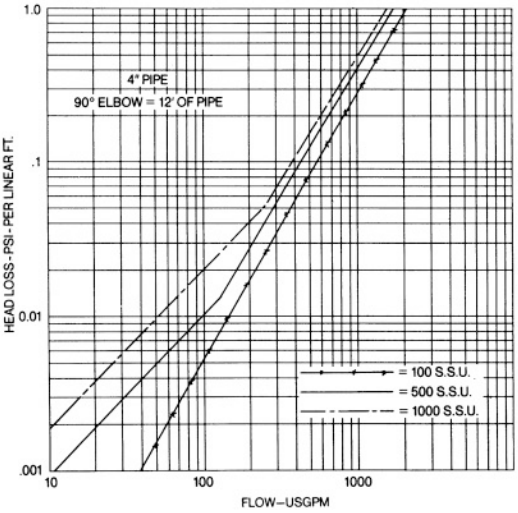

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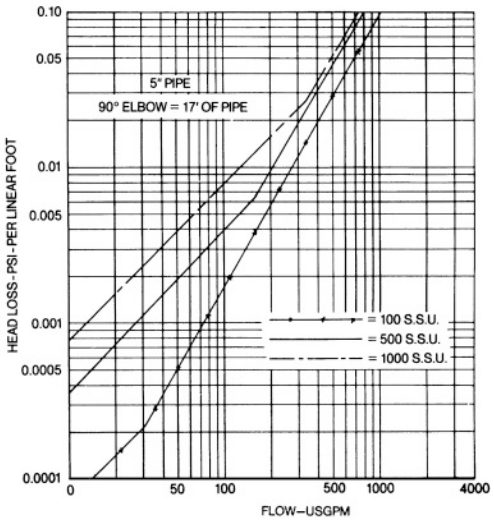

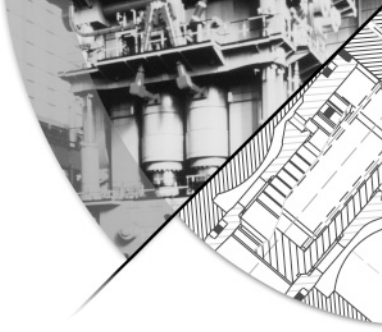

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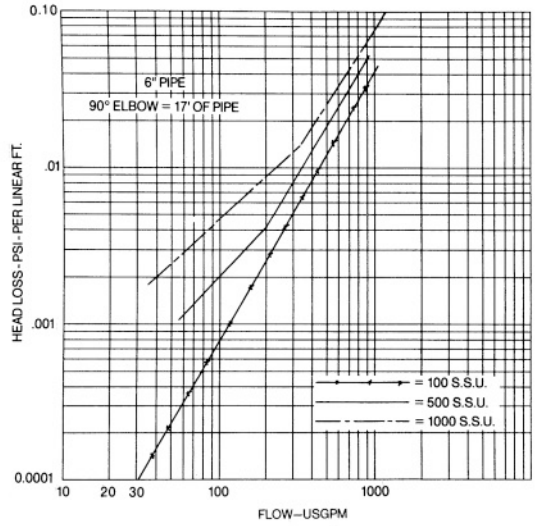

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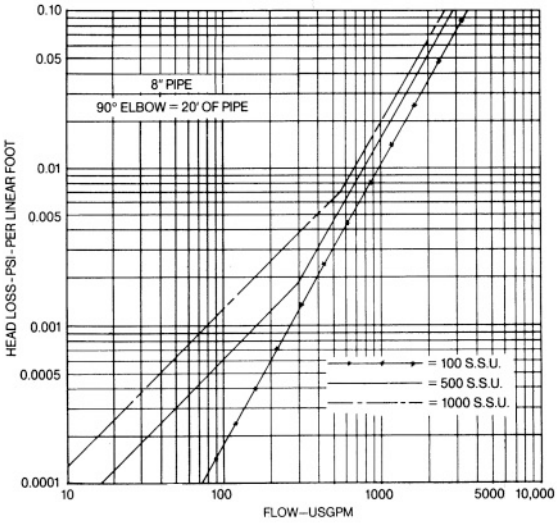

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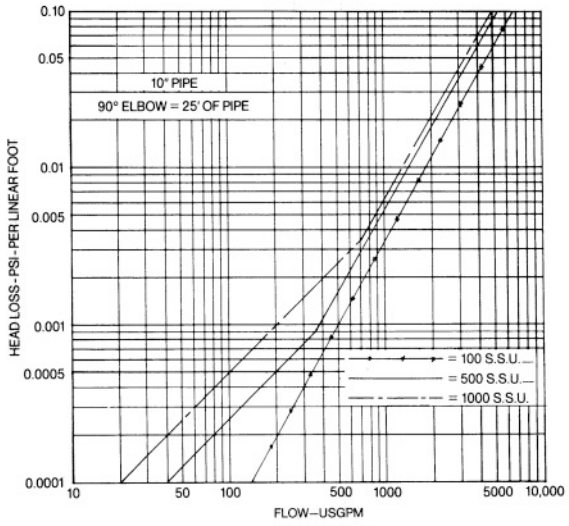

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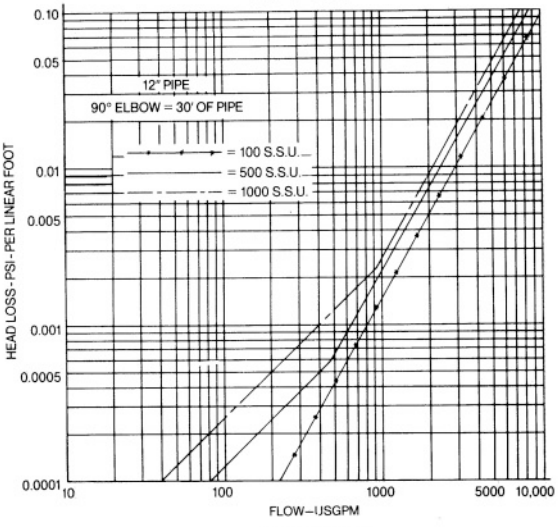

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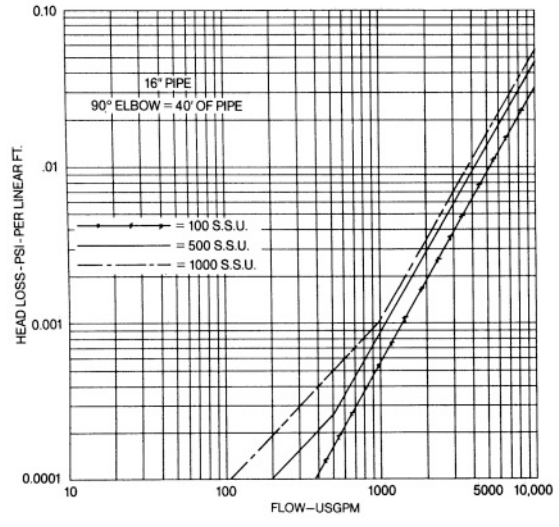

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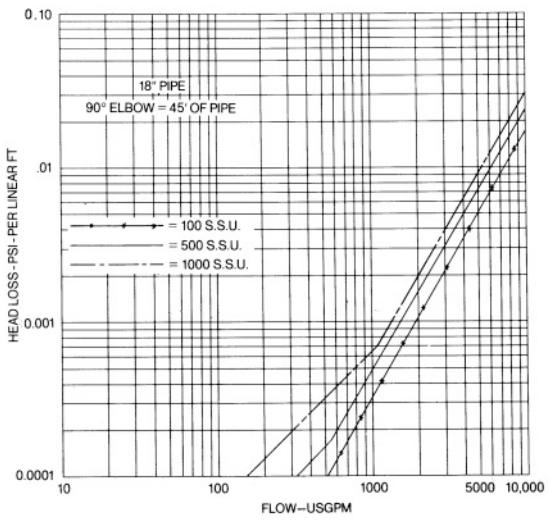

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