

## High Pressure Proportional Pressure Reducing Valve

### Model: BC-820-PP-P

The BERMAD BC-820-PP-P is a Hydraulically operated, piston actuated pressure reducing control valve that reduces a high upstream pressure to a lower downstream pressure at a fixed ratio.



#### 1.0 General Information:

Valve type: piston actuated, double chamber

Valve pattern: Y (oblique) and angle

Available sizes: 1.5"-24"/DN40-600

Maximum working pressure: 600 psi/40 bar

End connections:

- Grooved: (OGS) ANSI/AWWA C606 (1.5"-8"/DN40-200)
- Flanged: ANSI B16.5 class #300 (1.5"-24"/DN40-600)
- Threaded: NPT/BSP (1.5"-2.5"/DN40-65)

Working temperature: water up to 140°F/65°C

#### 2.0 Certificates:

NSF 61

NSF 372

Others:



WRAS  
UK

DVGW  
Germany

ACS  
France

GOST  
Russia

BELGAQUA  
Belgium

AS 5081  
Australia

Watermark  
Australia

PZH  
Poland

Bulgarcontrol  
Bulgaria

SVGW  
Switzerland

ISO 9001 - 2008

#### Job/Owner

System No.	
Location	

#### Contractor

Submitted by	
Date	

#### Engineer

Spec Section	
Paragraph	
Approved	
Date	

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File Name:	Submittal BC-820-PP-P	Rev. 01	Prepared By:	RL	Date:	11/17
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### 3.0 Construction Materials:

Body:

- Standard: Ductile Iron
- Optional: Stainless Steel 316

Cover (piston cylinder): Stainless Steel 316

Internals: Stainless Steel, Bronze and coated Steel

Bolts, nuts and studs: Stainless Steel 316

Elastomers:

- Piston seal: EPDM
- Seal: NBR
- O-rings: EPDM

Control trim:

- Control accessories: Stainless Steel 316
- Tubing & fittings: Stainless Steel 316

Coating: Epoxy fusion bonded

### 4.0 Control Information

Reduction ratios (P1/P2) range from 2.1 to 2.5 and are determined by the valve size.

Reduction ratio table:

Valve Size	1.5"-2.5"	3"	4"	6"	8"	10"	12"-14"	16"-24"
Ratio	2.3	2.3	2.5	2.2	2.3	2.3	2.1	2.2

### 5.0 General Notes:

Minimum operating pressure: 30 psi/2.0 bar

Recommendation: install a pressure relief valve model 73Q at downstream side

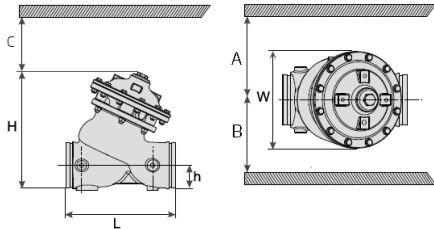
### 6.0 Specify When Ordering:

- Minimum and maximum flow rate (gpm/m<sup>3</sup>/h)
- Inlet pressure (psi/bar)
- Body material: Ductile Iron (standard) or Stainless Steel
- End connections: grooved (standard), flanged or threaded



### 7.0 Dimensions & Weights:

#### 7.1 Grooved Valves - ANSI/AWWA C606 (Standard)



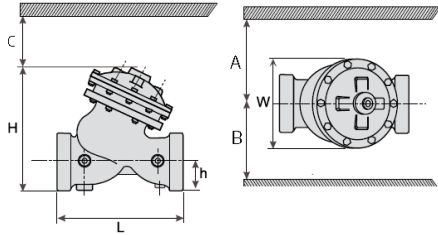
Inch	1½"	2"	2½"	3"	4"	6"	8"
L (inch)	8.07	8.07	8.46	9.84	12.60	16.34	19.69
L (mm)	205	210	215	250	320	415	500
W (inch)	4.80	4.80	4.80	6.02	7.87	11.22	14.17
W (mm)	122	122	122	153	200	285	360
h (inch)	1.30	1.30	1.56	2.36	2.91	3.74	4.92
h (mm)	33	39.5	39.5	60	74	95	125
H (inch)	7.64	7.87	7.91	10.43	12.80	17.36	21.06
H (mm)	194	200	201	265	325	441	535
Weight (lb.)	13	14	14	37	64	128	225
Weight (Kg)	6	6.2	6.5	17	29	58	102

$C = H/2$        $A, B = W \times 2$

Notes:

- Clearances A & B are based on the use of both sides of the valve for control accessories. In cases where both sides are not used, the clearance of the unused side should be equal to W
- Dimensions & Weights tables refer to basic valves
- Envelope dimensions vary according to valve model
- Control loop and control accessories adds approximately 5 lbs./2.3 kg to the weight of a basic valve

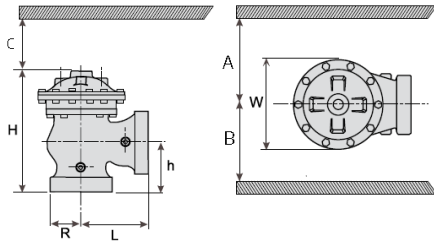
**7.2 Threaded Valves - NPT, BSP**



Inch	1½"	2"	2½"	3"
L (inch)	6.11	6.11	8.35	9.85
L (mm)	155	155	212	250
W (inch)	4.81	4.81	4.81	6.42
W (mm)	122	122	122	163
h (inch)	1.58	1.58	1.89	2.21
H (mm)	40	40	48	56
H (inch)	7.92	7.96	8.23	10.40
H (mm)	201	202	209	264
Weight (lb.)	12	12	18	37
Weight (Kg)	5.5	5.5	8	17

$C = H/2$        $A, B = W \times 2$

**7.3 Threaded Valves, Angle - NPT, BSP**



Inch	2"	2½"	3"
L (inch)	4.77	5.52	6.26
L (mm)	121	140	159
W (inch)	4.81	4.81	6.42
W (mm)	122	122	163
R (inch)	1.58	1.89	2.17
R (mm)	40	48	55
h (inch)	3.27	4.02	4.53
h (mm)	83	102	115
H (inch)	8.87	9.53	11.58
H (mm)	225	242	294
Weight (lb.)	12	15	33
Weight (kg)	5.5	7	15

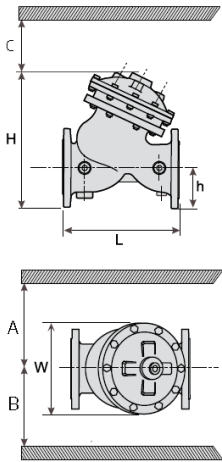
$C = H/2$        $A, B = W \times 2$

Notes:

- Clearances A & B are based on the use of both sides of the valve for control accessories. In cases where both sides are not used, the clearance of the unused side should be equal to W
- Dimensions & Weights tables refer to basic valves
- Envelope dimensions vary according to valve model
- Control loop and control accessories adds approximately 5 lbs./2.3 kg to the weight of a basic valve



### 7.4 Flanged Valves



	Inch	1½"	2"	2½"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
ANSI 150# & PN 10/16	L (inch)	8.08	8.27	8.75	9.85	12.61	16.35	19.70	23.84	28.57	28.88	39.01	39.40	43.34	57.13
	L (mm)	205	210	222	250	320	415	500	605	725	733	990	1,000	1,100	1,450
	W (inch)	6.11	6.50	7.01	7.88	8.79	12.61	15.37	18.91	21.67	21.67	29.16	29.16	29.16	33.29
	W (mm)	155	165	178	200	223	320	390	480	550	550	740	740	740	845
	h (inch)	3.07	3.27	3.74	3.94	4.53	5.63	6.78	8.04	9.53	10.56	11.82	12.57	13.91	18.52
	h (mm)	78	83	95	100	115	143	172	204	242	268	300	319	358	470
	H (inch)	9.42	9.61	10.12	12.02	14.42	19.38	23.01	28.53	33.10	34.12	43.66	44.40	45.98	50.39
	H (mm)	239	244	457	305	366	492	584	724	840	866	1,108	1,127	1,167	1,279
	Weight (lb.)	20	23	29	49	82	165	276	478	816	840	1,865	2,083	2,121	2,844
	Weight (Kg)	9.1	10.6	13	22	37	75	125	217	370	381	846	945	962	1,290
ANSI 300# & PN 25/40	L (inch)	8.08	8.27	8.75	10.40	13.99	17.06	20.65	25.10	30.02	30.22	40.35	40.58	44.76	59.10
	L (mm)	205	210	222	264	355	433	524	637	762	767	1,024	1,030	1,136	1,500
	W (inch)	6.11	6.50	7.29	8.16	9.85	12.61	15.37	18.91	21.67	22.46	29.16	29.16	29.55	33.29
	W (mm)	155	165	185	207	250	320	390	480	550	570	740	740	750	845
	h (inch)	3.07	3.27	3.74	4.14	5.00	6.26	7.53	8.79	10.28	11.62	12.81	14.07	15.33	18.52
	h (mm)	78	83	95	105	127	159	191	223	261	295	325	357	389	470
	H (inch)	9.42	9.61	10.13	12.38	14.88	20.02	23.72	29.23	33.84	35.18	44.64	45.90	47.16	50.39
	H (mm)	239	244	257	314	278	508	602	742	859	893	1,133	1,165	1,197	1,279
	Weight (lb.)	22	27	33	55	95	187	322	540	904	957	1,984	2,132	2,174	3,289
	Weight (Kg)	10	12.2	15	25	43	85	146	245	410	434	900	967	986	1,492

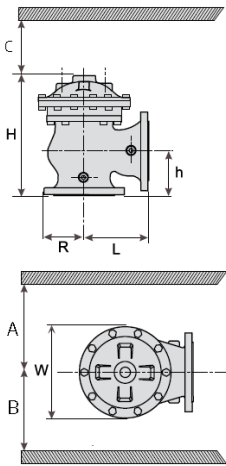
$C = H/2$        $A, B = W \times 2$

**Notes:**

- Clearances A & B are based on the use of both sides of the valve for control accessories. In cases where both sides are not used, the clearance of the unused side should be equal to W
- Dimensions & Weights tables refer to basic valves
- Envelope dimensions vary according to valve model
- Control loop and control accessories adds approximately 5 lbs./2.3 kg to the weight of a basic valve



**7.5 Flanged Valves, Angle**



	Inch	1½"	2"	2½"	3"	4"	6"	8"	10"	12"	14"	16"	18"
ANSI 150# & PN 10/16	L (inch)	4.89	4.89	5.87	5.99	7.49	8.87	10.44	12.61	15.60	15.76	17.73	17.73
	L (mm)	124	124	149	152	190	225	265	320	396	400	450	450
	W (inch)	6.11	6.11	7.01	7.88	8.75	12.61	15.37	18.91	21.67	21.67	29.16	29.16
	W (mm)	155	155	178	200	222	320	390	480	550	550	740	740
	R (inch)	3.07	3.27	3.74	3.94	4.53	5.63	6.78	8.04	9.77	10.40	11.78	12.61
	R (mm)	78	83	95	100	115	143	172	204	248	264	299	320
	h (inch)	3.35	3.35	4.29	4.02	5.00	5.99	8.00	8.63	10.76	10.99	14.54	14.58
	h (mm)	85	85	109	102	127	152	203	219	273	279	369	370
	H (inch)	8.94	8.94	9.89	11.07	13.47	17.38	21.47	24.94	30.61	30.77	42.63	42.63
	H (mm)	227	227	251	281	342	441	545	633	777	781	1,082	1,082
Weight (lb.)	21	22	27	44	77	157	260	452	772	816	1,764	1,808	
Weight (Kg)	9.5	10	12	21.5	35	71	118	205	350	370	800	820	
ANSI 300# & PN 25/40	L (inch)	4.89	4.89	5.87	6.26	7.88	9.22	10.91	13.24	16.35	16.51	18.40	18.40
	L (mm)	124	124	149	159	200	234	277	336	415	419	467	467
	W (inch)	6.50	6.50	7.29	8.16	9.85	12.61	15.37	18.91	21.67	21.67	29.16	29.16
	W (mm)	165	165	185	207	250	320	390	480	550	550	740	740
	R (inch)	3.07	3.35	3.74	4.14	5.00	6.26	7.53	8.79	10.28	11.54	12.81	14.11
	R (mm)	78	85	95	105	127	159	191	223	261	293	325	358
	h (inch)	3.35	3.35	4.29	4.29	5.32	6.50	8.51	9.30	11.58	11.78	15.21	15.21
	h (mm)	85	85	109	109	135	165	216	236	294	299	386	386
	H (inch)	8.94	8.94	9.89	11.31	13.79	17.89	21.99	25.57	31.36	31.56	43.30	43.30
	H (mm)	227	227	251	287	350	454	558	649	796	801	1,099	1,099
Weight (lb.)	24	25	30	51	90	187	304	514	860	937	1,885	1,918	
Weight (Kg)	11	11.5	13.5	23	41	81	138	233	390	425	855	870	

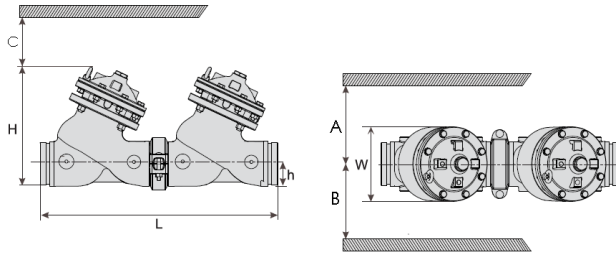
C = H/2      A, B = Wx2

Notes:

- Clearances A & B are based on the use of both sides of the valve for control accessories. In cases where both sides are not used, the clearance of the unused side should be equal to W
- Dimensions & Weights tables refer to basic valves
- Envelope dimensions vary according to valve model
- Control loop and control accessories adds approximately 5 lbs./2.3 kg to the weight of a basic valve



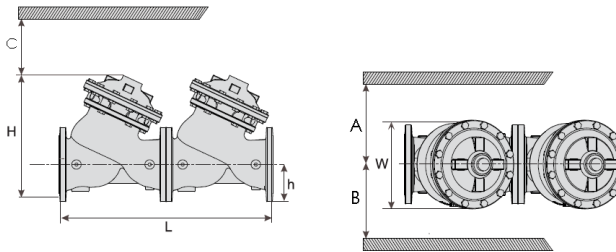
**7.6 Grooved Dual Combo Valves 725-H - ANSI/AWWA C606 (Standard)**



Inch	1½"	2"	2½"	3"	4"	6"	8"
L (inch)	16.14	16.14	16.92	19.68	25.20	32.68	39.38
L (mm)	410	420	430	500	640	830	1,000
W (inch)	4.80	4.80	4.80	6.02	7.87	11.22	15.35
W (mm)	122	122	122	153	200	285	360
h (inch)	1.30	1.30	1.56	2.36	2.91	3.74	4.92
h (mm)	33	33	39.5	60	74	95	125
H (inch)	7.64	7.87	7.91	10.43	12.80	17.36	21.06
H (mm)	194	200	201	265	325	441	535
Weight (lb.)	26	28	28	74	128	256	450
Weight (Kg)	12	12.4	13	34	58	116	204

C = H/2      A, B = Wx2

**7.7 Flanged, Dual Combo Valves 725-H—ANSI Class 150, PN 10/16**



Inch	1½"	2"	2½"	3"	4"	6"	8"
L (inch)	16.16	16.54	17.50	19.70	25.22	32.70	39.40
L (mm)	410	420	444	500	640	830	1,000
W (inch)	6.11	6.50	7.01	7.88	8.79	12.61	15.37
W (mm)	155	165	178	200	223	320	390
h (inch)	3.07	3.27	3.74	3.94	4.53	5.63	6.78
h (mm)	78	83	95	100	115	143	172
H (inch)	9.42	9.61	10.12	12.02	14.42	19.38	23.01
H (mm)	239	244	257	305	366	492	584
Weight (lb.)	40	46	58	98	164	330	552
Weight (Kg)	18	21	26	44	74	150	250

C = H/2      A, B = Wx2

Notes:

- Clearances A & B are based on the use of both sides of the valve for control accessories. In cases where both sides are not used, the clearance of the unused side should be equal to W
- Dimensions & Weights tables refer to basic valves
- Envelope dimensions vary according to valve model
- Control loop and control accessories adds approximately 5 lbs./2.3 kg to the weight of a basic valve



**8.0 Flow Properties**

Inch	1½"	2"	2½"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
Cv	49	58	64	133	230	530	940	1,440	2,140	2,300	3,820	3,960	4,100	4,100
Kv	42	50	55	115	200	460	815	1,250	1,850	1,990	3,310	3,430	3,550	3,550
K	2.3	3.9	9.2	4.9	3.9	3.7	3.8	3.9	3.7	5.9	3.7	5.5	7.8	11.1
Leq feet	15	35	105	70	77	125	181	233	283	496	356	644	1,019	1,744
Leq meter	4.3	10.3	33.4	21.6	23.0	37.5	53.9	70.0	85.6	159.9	112.7	204.8	323.8	532.0

**8.1 Differential Pressure Calculation (for fully open valve)**

Valve flow coefficient, Kv or Cv       $Kv(Cv) = Q \sqrt{\frac{Gf}{\Delta P}}$   
 Where:

Kv = Valve flow coefficient (flow in m³/h at 1bar ΔP)

Cv = Valve flow coefficient (flow in gpm at 1psiΔP)  
 (Cv = 1.155 Kv)

Q = Flow rate (m³/h ; gpm)

ΔP = Differential pressure (bar ; psi)

Gf = Liquid specific gravity (Water = 1.0)

Practical formulas for water:

$$Q = Kv \sqrt{\Delta P} \quad \Delta P = \left( \frac{Q}{Kv} \right)^2$$

Flow resistance or Head loss coefficient,  $K = \Delta H \frac{2g}{V^2}$   
 Where:

K = Flow resistance or Head loss coefficient (dimensionless)

ΔH = Head loss (m ; feet)

V = Nominal size flow velocity (m/sec ; feet/sec.)

g = Acceleration of gravity (9.81 m/sec² ; 32.18 feet/sec²)

Practical formula:

$$\Delta H = K \frac{V^2}{2g}$$

**Equivalent Pipe Length - Leq**

In order to simplify system head loss calculation, add the Leq value to the pipe length of the relevant size

**Note:**

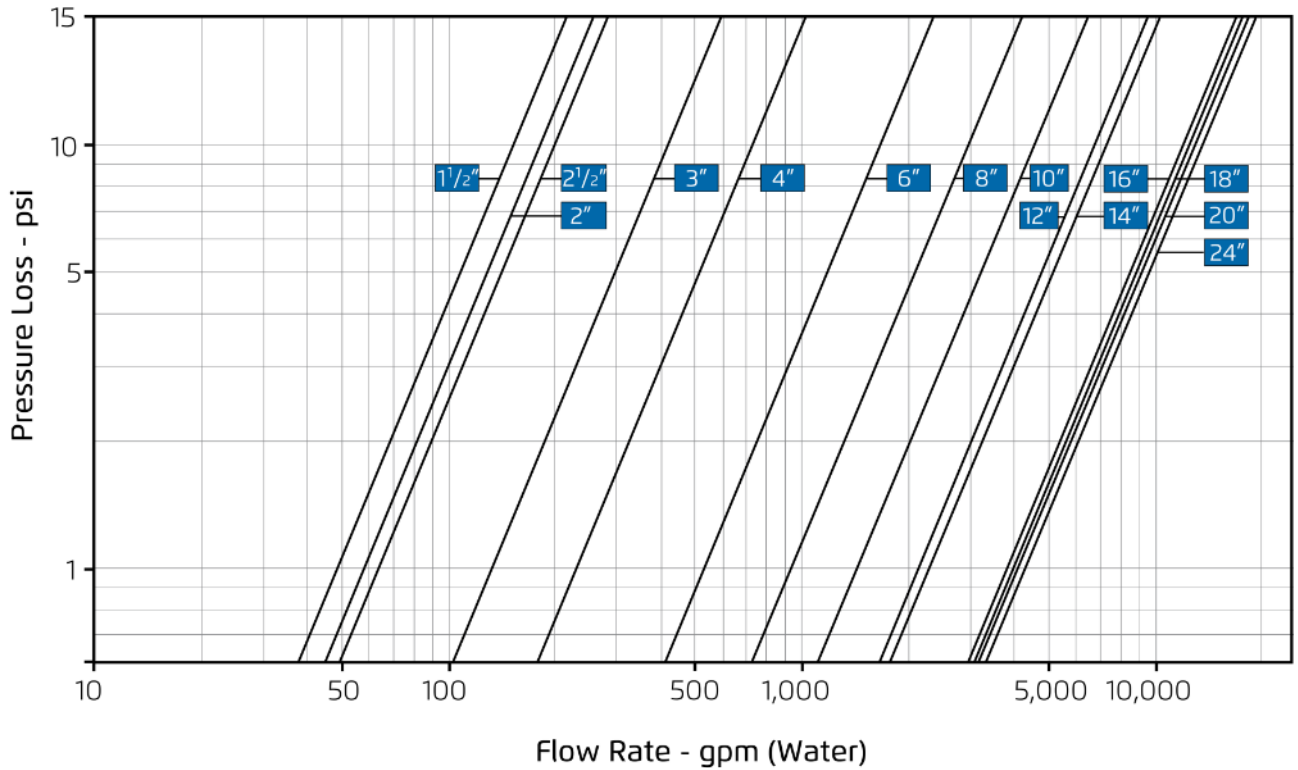
The Leq values given are for general consideration only.

Actual Leq may vary somewhat with each of the valve sizes.





**8.2 Flow Chart (US/Imperial units)**



**8.3 Flow Chart (SI/Metric units)**

