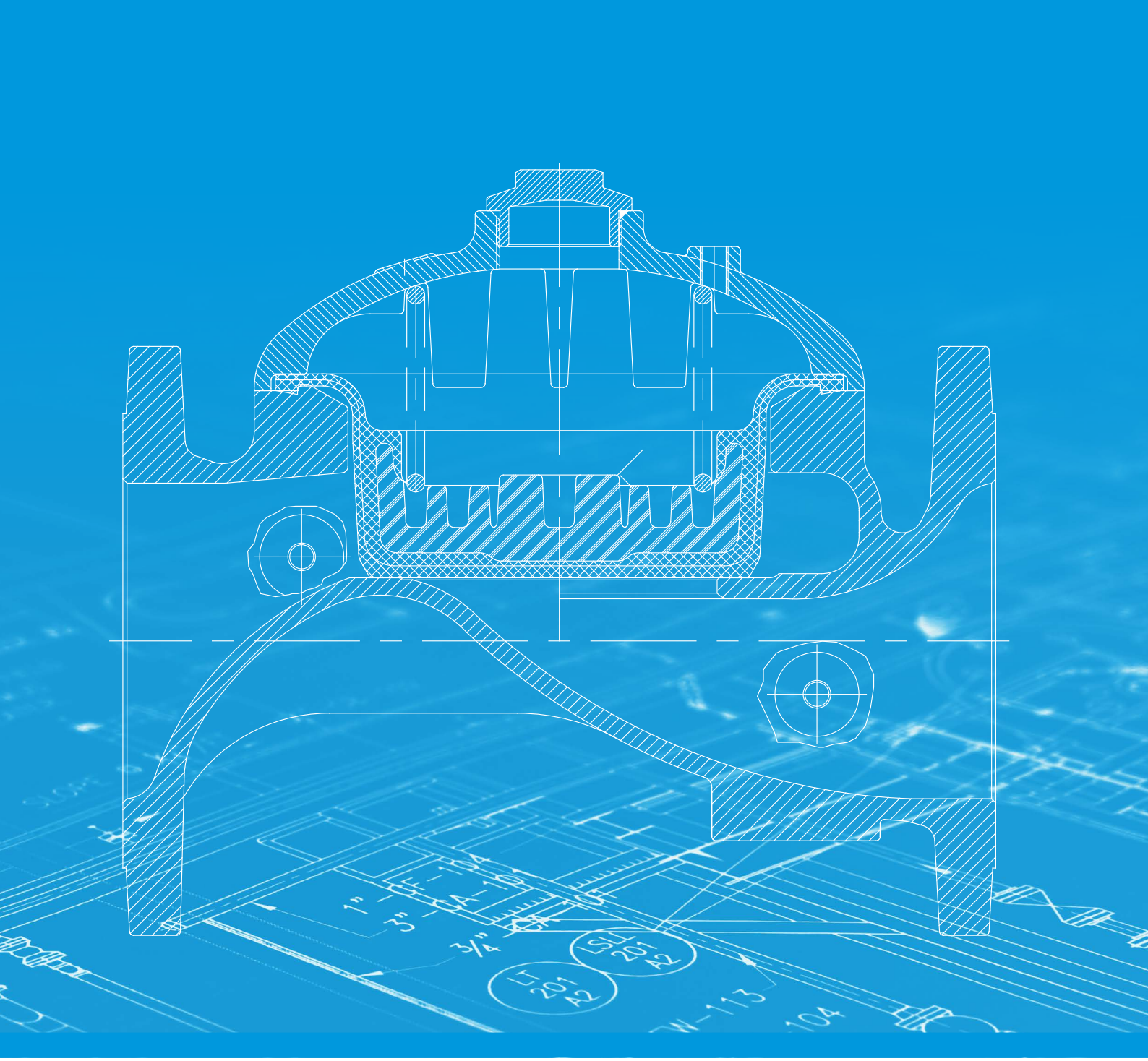


BERMAD
BC/WW-400 SERIES

ENGINEERING DATA

400 SERIES INTRODUCTION

The 400 Series valves are at the leading edge of control valve design virtually free of the typical limitations associated with other diaphragm single chambered valves. The body design includes a full-bore seat with unobstructed flow path. The internal design is using advanced rubber-based materials to achieve a solid, one-piece elastomeric assembly including a flexible diaphragm, vulcanized with a rugged radial seal disc. The diaphragm is carefully balanced and peripherally supported to avoid distortion and to protect the elastomer, resulting in long-life and controlled actuation even under harsh conditions.

Features and Benefits

- In-line serviceable, easy & simple maintenance
- Excellent flow capacity with minimum head-loss
- Accurate & stable regulation at a wide flow range
- Easy addition of control features

Typical Applications

Pressure reducing systems and level control in:

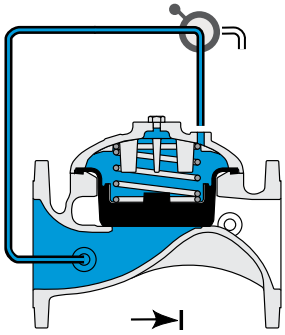
- Buildings and constructions
- Waterworks systems
- Water treatment plants

Standards

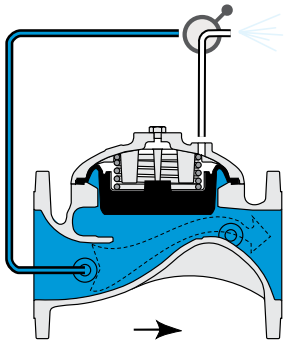
IQNet	ISO 9001-2015 Certified Quality Assurance System
ISO 9001	ISO 9001-2015 Certified Quality Assurance System

Principle of Operation

On-Off Modes

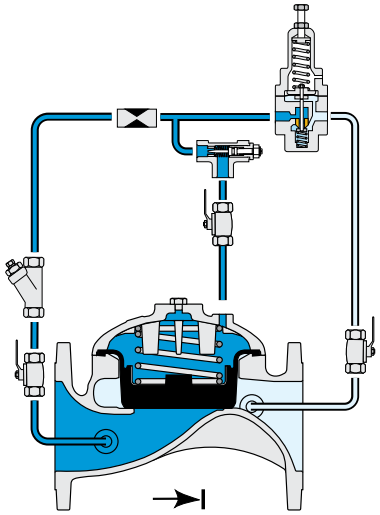


Closed Position
Line pressure applied to the control chamber of the valve creates a hydraulic force that moves the valve to the closed position and provides drip tight sealing.

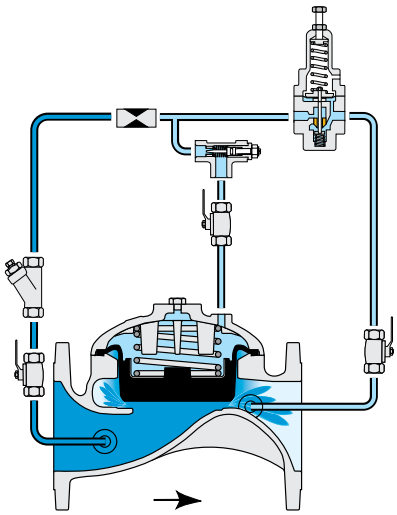


Open Position
Discharging the pressure from the control chamber to atmosphere or some other lower pressure zone, causes the line pressure acting on the plug to open the valve.

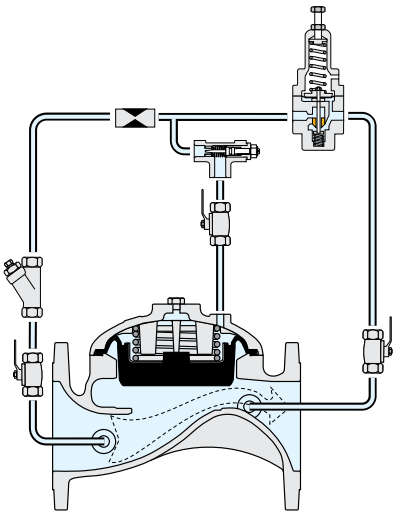
2-Way Modulating Modes - Pressure Reducing



Closed Position
The closed adjustable pilot valve traps line pressure in the control chamber. The resulting superior force moves the valve to the closed position and provides drip-tight sealing.



Modulating Position
The pilot valve senses line pressure changes and opens or closes accordingly. It controls the accumulated pressure in the valve control chamber, causing main valve to modulate to an intermediate position and maintain the preset pressure value.



Open Position
The open pilot valve releases line pressure from the control chamber. The line pressure acting on the plug to open the valve..

Technical Data

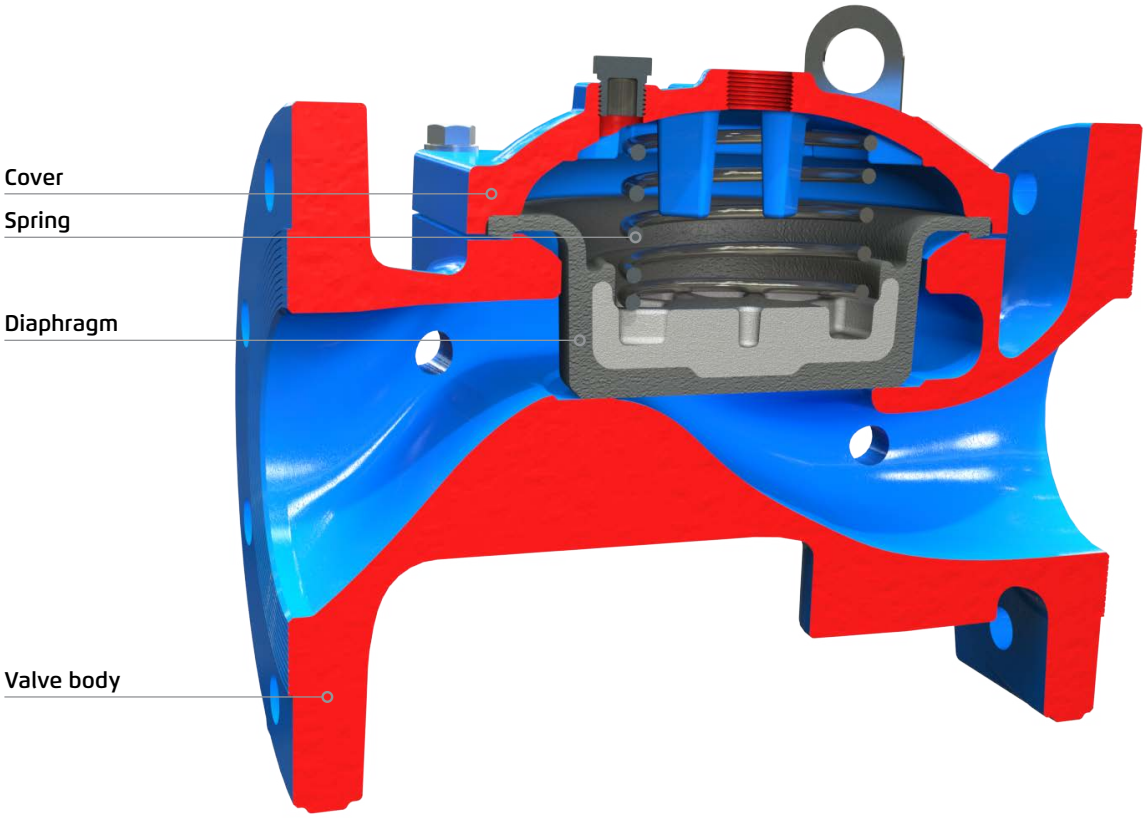
Size Range: DN40-DN300; 1.5"-12"
Valve Pattern: Globe
Pressure Rating: PN16; ANSI Class 150 (Ductile Iron)
Operating Pressure Range: 0.8-16 bar; 12-250 psi
End Connections:
Flanged: All standards
Threaded: BSP (Rp ISO 7/1); NPT
Grooved: ANSI C606 or BS 1387 / EN 10255
Working Temperature: Water up to 60°C; 140°F

Standard Materials:

Body & Cover:
Ductile Iron EN 1563 GR.GJS-450-10; ASTM A536 65-45-12
Diaphragm: Reinforced EPDM with vulcanized radial seal disk
Spring: Stainless Steel 302
Bolting: Steel
Coating: Dark blue fusion bonded epoxy

Optional Materials:

Body & Cover (flanged only):
Stainless Steel 316 ASTM A351 Grade CF8M
Spring: Stainless Steel 316
Bolting: Stainless Steel 316

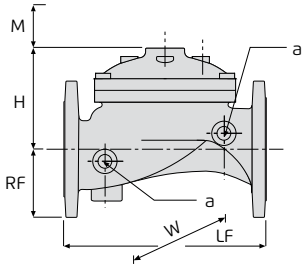


Metric

Dimensions & Weights

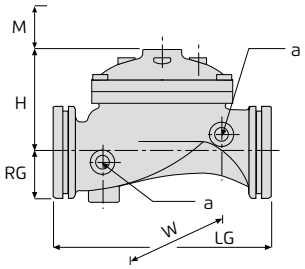
Flanged

Nominal Diameter	inch	2"	2.5"	3"	4"	6"	8"	10"	12"
	mm	50	65	80	100	150	200	250	300
LF	mm	205	205	257	320	415	500	605	725
W	mm	155	178	200	223	306	365	405	610
RF	mm	76	93	100	116	140	172	203	242
H	mm	74	86	110	130	205	256	256	373
Weight	kg	9	10.5	19	28	68	125	140	250



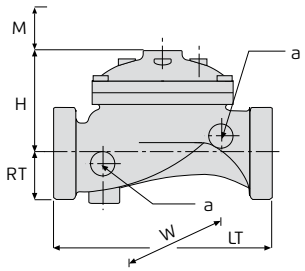
Grooved

Nominal Diameter	inch	2"	3"	4"	6"	8"
	mm	50	80	100	150	200
LG	mm	205	250	320	415	500
W	mm	119	175	204	306	379
RG ANSI C606	mm	30.2	44.5	57.2	84.2	110
RG BS 1387 / EN 10255	mm	30.2	44.5	57.2	82.6	110
H	mm	74	110	130	205	256
Weight	kg	5	11	16	49	108



Threaded

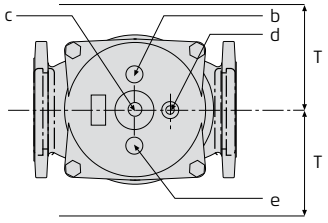
Nominal Diameter	inch	1.5"	2"	2.5"
	mm	40	50	65
LT	mm	153	180	210
W	mm	98	120	129
RT	mm	29	37	40
H	mm	58	74	87
Weight	kg	2	4	5.7



General Dimensions

Nominal Diameter	inch	1.5"	2"	2.5"	3"	4"	6"	8"	10"	12"
	mm	40	50	65	80	100	150	200	250	300
a	inch	2x¼" NPT	4x¼" NPT				4x⅜" NPT			4x½" NPT
b	inch	N/A					⅜" NPT			
c	inch	¼" NPT	½" NPT							2"G
d	inch	N/A	¼" NPT							½" NPT
e	inch	N/A								⅜" NPT
M	mm	50	75	85	110	130	205	255	255	375
T	mm	350	350	350	370	395	430	475	520	545
V	Liter	0.06	0.11	0.18	0.29	0.67	1.97	3.86	3.86	13.75

M - Maintenance allowance
T - Maximal control trim space for left or right side trim
V - Control chamber displacement volume



Metric

Flow Factors

inch	1.5"	2"	2.5"	3"	4"	6"	8"	10"	12"
mm	40	50	65	80	100	150	200	250	300
Kv	29	57	78	136	204	458	781	829	1932
K	4.8	3.2	4.2	2.9	4.0	4.0	4.4	8.9	3.6
Leq - m	7.9	9.1	12.1	13.7	14	27.4	45.8	108	57

Differential Pressure & Flow Calculation

Valve flow coefficient, Kv $Kv = Q\sqrt{\frac{Gf}{\Delta P}}$

Where:

Kv = Valve flow coefficient (flow in m^3/h at 1bar ΔP)

Q = Flow rate (m^3/h)

ΔP = Differential pressure (bar)

Gf = Liquid specific gravity (Water = 1.0)

Practical formulas for water:

$Q = Kv\sqrt{\Delta P}$ $\Delta P = \left(\frac{Q}{Kv}\right)^2$ $Cv = 1.155\ Kv$

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)

V = Nominal size flow velocity (m/sec)

g = Acceleration of gravity ($9.81\ m/sec^2$)

Practical formula:

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

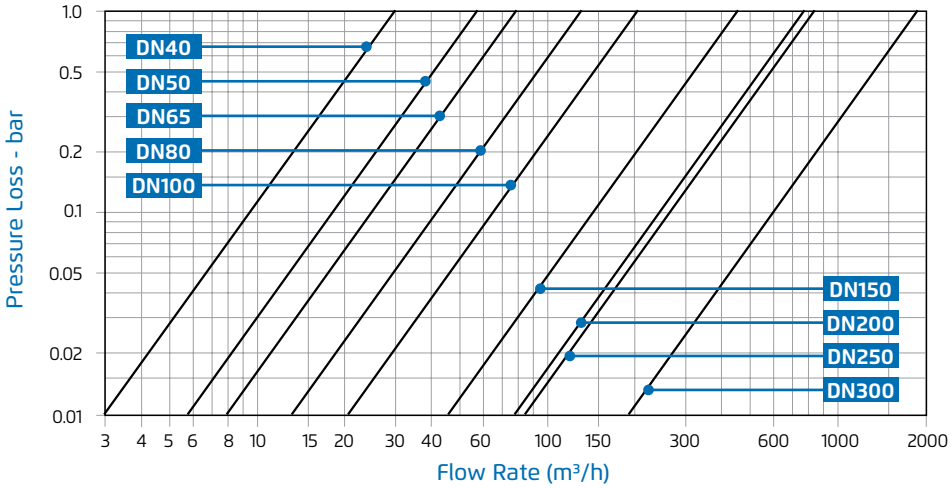
Equivalent Pipe Length - Leq

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.

Flow Charts

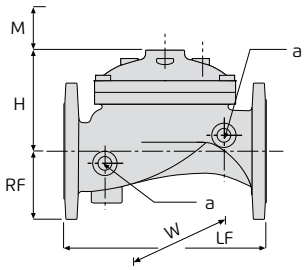


US units

Dimensions & Weights

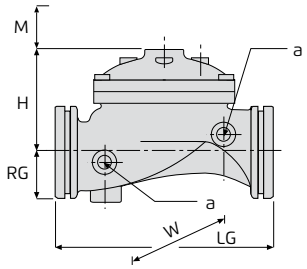
Flanged

Nominal Diameter	inch	2"	2.5"	3"	4"	6"	8"	10"	12"
	mm	50	65	80	100	150	200	250	300
LF	inch	8.07	8.07	10.12	12.60	16.34	19.69	23.82	28.54
W	inch	6.10	7.01	7.87	8.78	12.05	14.37	15.94	24.02
RF	inch	2.99	3.66	3.94	4.57	5.51	6.77	7.99	9.53
H	inch	2.91	3.39	4.33	5.12	8.07	10.08	10.08	14.69
Weight	lbs	20	23	42	62	150	276	309	551



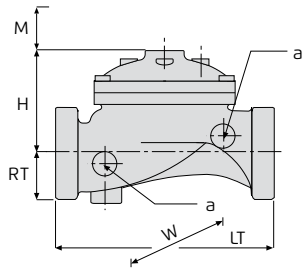
Grooved

Nominal Diameter	inch	2"	3"	4"	6"	8"
	mm	50	80	100	150	200
LG	inch	8.07	9.84	12.60	16.34	19.69
W	inch	4.69	6.89	8.03	12.05	14.92
RG ANSI C606	inch	1.19	1.75	2.25	3.31	4.33
RG BS 1387 / EN 10255	inch	1.19	1.75	2.25	3.25	4.33
H	inch	2.91	4.33	5.12	8.07	10.08
Weight	lbs	11	24	35	108	238



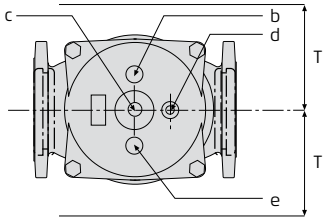
Threaded

Nominal Diameter	inch	1.5"	2"	2.5"
	mm	40	50	65
LT	inch	6.02	7.09	8.27
W	inch	3.86	4.72	5.08
RT	inch	1.14	1.46	1.57
H	inch	2.28	2.91	3.43
Weight	lbs	4	9	13



General Dimensions

Nominal Diameter	inch	1.5"	2"	2.5"	3"	4"	6"	8"	10"	12"
	mm	40	50	65	80	100	150	200	250	300
a	inch	2x¼" NPT	4x¼" NPT				4x⅜" NPT			4x½" NPT
b	inch	N/A					⅜" NPT			
c	inch	¼" NPT	½" NPT							2"G
d	inch	N/A	¼" NPT							½" NPT
e	inch	N/A								⅜" NPT
M	inch	1.95	2.95	3.35	4.35	5.10	8.05	10.05	10.05	14.75
T	inch	13.80	13.80	13.80	14.55	15.55	16.95	18.70	20.45	21.45
V	Gallons	0.02	0.03	0.05	0.08	0.18	0.52	1.02	1.02	3.63



M - Maintenance allowance
T - Maximal control trim space for left or right side trim
V - Control chamber displacement volume

US units

Flow Factors

inch	1.5"	2"	2.5"	3"	4"	6"	8"	10"	12"
mm	40	50	65	80	100	150	200	250	300
Cv	33	66	90	157	236	529	902	957	2231
K	4.8	3.2	4.2	2.9	4.0	4.0	4.4	8.9	3.6
Leq - feet	26	30	40	45	46	90	150	354	187

Differential Pressure & Flow Calculation

Valve flow coefficient, Cv $Cv = Q\sqrt{\frac{Gf}{\Delta P}}$

Where:

Cv = Valve flow coefficient (flow in gpm at 1psi ΔP)

Q = Flow rate (gpm)

ΔP = Differential pressure (psi)

Gf = Liquid specific gravity (Water = 1.0)

Practical formulas for water:

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

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 (feet)

V = Nominal size flow velocity (feet/sec)

g = Acceleration of gravity (32.18 feet/sec²)

Practical formula:

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

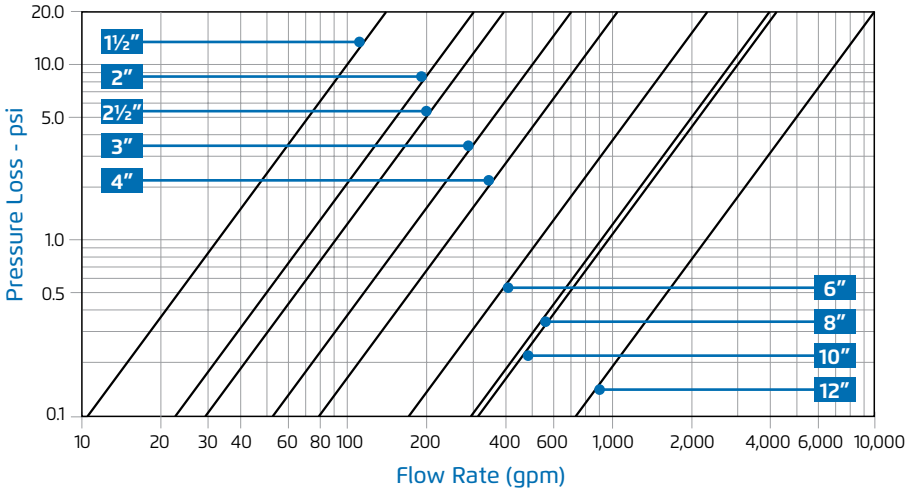
Equivalent Pipe Length - Leq

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.

Flow Charts



Valve Options and Features

Valve Position Indicator - Code I

The BERMAD Valve Position Indicator Assembly provides a visual indication of valve opening and regulation behavior.

Limit Switch Assembly - Code S

The BERMAD Limit Switch Assembly includes mechanical electrical change over contacts (NO + NC), enabling remote signaling of the closed valve position and visual indication of valve opening and regulation behavior.

Flow Stem - Code M

The BERMAD Flow Stem Assembly enables limiting the opening stroke of the control valve.

The above options requires special cover and diaphragm. Consult factory.

www.bermad.com

February 2024