

SI 700 Metric

Available Sizes & Patterns

- DN 40 - DN 500 - Y Pattern
- DN 40 - DN 450 - Angle
- DN 600 - DN 800 - Globe

Connection Standard

- Flanged: ISO 7005-2 (ISO 10, 16 & 25)
- Threaded: BSP (Rp ISO 7/1) or NPT (DN 40 - DN 80)

Water Temperature

- Up to 80°C

Working pressure

- ISO PN 16: 16 bar
- ISO PN 25: 25 bar

Standard Materials

- **Main valve body and cover**
Ductile Iron to EN 1563
- **Main valve internals**
Stainless Steel, Bronze & Epoxy coated Steel
- **Control Trim**
Brass, Bronze accessories
Stainless Steel 316 fittings & tubing
or forged Brass fittings & Copper tubing
- **Elastomers**
NBR
- **Coating**
Blue fusion bonded Epoxy

Optional Materials

- **Main valve body and cover**
Carbon Steel to EN 10083-1
Stainless Steel 316 to EN 10088-1
Nickel Aluminum Bronze to BS-EN 1400 AB-2
Other materials on request
- **Control Trim**
Stainless Steel 316, Nickel Aluminum Bronze,
Hastalloy C-276 accessories
Monel fittings & tubing
- **Elastomers**
EPDM
FPM



SI 800 Metric

Available Sizes & Patterns

- DN 40 - DN 500 - Y Pattern
- DN 40 - DN 450 - Angle

Connection Standard

- Flanged: ISO 7005-1 (ISO 10, 16, 25 & 40)

Water Temperature

- Up to 80°C

Working pressure

- ISO PN 16: 16 bar
- ISO PN 25: 25 bar
- ISO PN 40: 40 bar

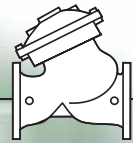
Standard Materials

- **Main valve body**
Carbon Steel to EN 10083-1
- **Valve cover (piston cylinder)**
Stainless Steel or Bronze
- **Main valve internals**
Stainless Steel and Bronze
- **Control Trim**
Brass, Bronze accessories
Stainless Steel 316 fittings & tubing
or forged Brass fittings & copper tubing
- **Elastomers**
NBR
- **Coating**
Blue fusion bonded Epoxy

Optional Materials

- **Main valve body and Cover**
Ductile Iron to EN 1563
Stainless Steel 316 to EN 10088-1
Nickel Aluminum Bronze to BS-EN 1400 AB-2
Other materials on request
- **Control Trim**
Stainless Steel 316, Nickel Aluminum Bronze,
Hastalloy C-276 accessories
Monel fittings & tubing
- **Elastomers**
EPDM
FPM

BERMAD Irrigation



Dimensions & Weights

WW-700 Series



700 Metric

Flanged

Y Pattern

		mm	40	50	65	80	100	150	200	250	300	350	400	450	500
	ISO PN 10 ; 16	L	205	210	222	250	320	415	500	605	725	733	990	1000	1100
		W	155	165	178	200	223	320	390	480	550	550	740	740	740
		h	78	83	95	100	115	143	172	204	242	268	300	319	358
		H	239	244	257	305	366	492	584	724	840	866	1108	1127	1167
	ISO PN 20 ; 25	L	205	210	222	264	335	433	524	637	762	767	1024	1030	1136
		W	155	165	185	207	250	320	390	480	550	570	740	740	750
		h	78	83	95	105	127	159	191	223	261	295	325	357	389
		H	239	244	257	314	378	508	602	742	859	893	1133	1165	1197
		Weight (Kg)	9.1	10.6	13	22	37	75	125	217	370	381	846	945	962
		Weight (Kg)	10	12.2	15	25	43	85	146	245	410	434	900	967	986

Length according to EN 558-1

		mm	600	700	750	800
	ISO PN 10 ; 16	L	1450	1650	1750	1850
		W	1250	1250	1250	1250
		h	470	490	520	553
		H	1965	1985	2015	2048
	ISO PN 20 ; 25	L	1500	1650	1750	1850
		W	1250	1250	1250	1250
		h	470	490	520	553
		H	1965	1985	2015	2048
		Weight (Kg)	3250	3700	3900	4100
		Weight (Kg)	3500	3700	3900	4100

Y Pattern - Length according to EN 558-1

		DN	50	80	100	150	200	250	300
	ISO PN 10 ; 16	L	230	310	350	480	600	730	850
		W	165	200	235	320	390	480	550
		h	82.5	100	118	150	180	213	243
		H	244	305	369	500	592	733	841
		Weight (Kg)	9.7	21	31	70	115	198	337
	ISO PN 20 ; 25	L	230	310	350	480	600	730	850
		W	165	200	235	320	390	480	550
		h	82.5	100	118	150	180	213	243
		H	244	305	369	500	592	733	841
		Weight (Kg)	9.7	21	31	70	115	198	337

Angle Pattern

		mm	40	50	65	80	100	150	200	250	300	350	400	450
	ISO PN 10 ; 16	L	124	124	149	152	190	225	265	320	396	400	450	450
		W	155	155	178	200	222	320	390	480	550	550	740	740
		R	78	83	95	100	115	143	172	204	248	264	299	320
		h	85	85	109	102	127	152	203	219	273	279	369	370
	ISO PN 20 ; 25	L	124	124	149	159	200	234	277	336	415	419	467	467
		W	165	165	185	207	250	320	390	480	550	550	740	740
		R	78	85	95	105	127	159	191	223	261	293	325	358
		h	85	85	109	109	135	165	216	236	294	299	386	386
		H	227	227	251	287	350	454	558	649	796	801	1099	1099
		Weight (Kg)	9.5	10	12	21.5	35	71	118	205	350	370	800	820
		Weight (Kg)	11	11.5	13.5	23	41	81	138	233	390	425	855	870

Threaded

Angle Pattern

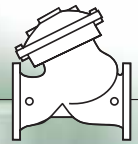
		mm	50	65	80
	BSP ; NPT	L	121	140	159
		W	122	122	163
		R	40	48	55
		h	83	102	115
		H	225	242	294
		Weight (Kg)	5.5	7	15

Y Pattern

		mm	40	50	65	80
	BSP ; NPT	L	155	155	212	250
		W	122	122	122	163
		h	40	40	48	56
		H	201	202	209	264
		Weight (Kg)	5.5	5.5	8	17



BERMAD Irrigation



Dimensions & Weights

WW-700 Series



700 Metric

European Standard (EN 558-1)

Flanged

Y Pattern

		DN	50	80	100	150	200	250	300	350	400	450	500	40	65
	PN 10 ; 16	L*	230	310	350	480	600	730	850	733	990	1000	1100	205	222
		W	165	200	235	320	390	480	550	550	740	740	740	155	190
		h	82.5	100	118	150	180	213	243	268	300	319	358	78	95
		H	244	305	369	500	592	733	841	866	1108	1127	1167	239	257
		Weight (Kg)	9.7	21	31	70	115	198	337	381	846	945	962	9.1	13
	PN 25	L*	230	310	350	480	600	730	850	767	1024	1030	1136	205	222
		W	165	200	235	320	390	480	550	570	740	740	750	155	190
		h	82.5	100	118	150	180	213	243	295	325	357	389	78	95
		H	244	305	369	500	592	733	841	893	1133	1165	1197	239	257
		Weight (Kg)	9.7	21	31	70	115	198	337	434	900	967	986	10	15

* Length according to EN 558-1 for DN 50, 80, 100, 150, 200, 250 & 300.

G Pattern

		DN	600	700	750	800								
	PN 10 ; 16	L*	1450	1650	1750	1850								
		W	1250	1250	1250	1250								
		h	470	490	520	553								
		H	1965	1985	2015	2048								
		Weight (Kg)	3250	3700	3900	4100								
	PN 25	L	1500	1650	1750	1850								
		W	1250	1250	1250	1250								
		h	470	490	520	553								
		H	1965	1985	2015	2048								
		Weight (Kg)	3500	3700	3900	4100								

* Length according to EN 558-1.

On request (Y Pattern)

DN	50	80	100	150	200	250	300
L	210	250	320	415	500	605	725
W	165	200	229	320	390	480	550
h	83	100	115	143	172	204	242
H	244	305	366	492	584	724	840
Weight (Kg)	10.6	22	37	75	125	217	370

Angle Pattern

		DN	40	50	65	80	100	150	200	250	300	350	400	450
	PN 10 ; 16	L	124	124	149	152	190	225	265	320	396	400	450	450
		W	155	155	178	200	222	320	390	480	550	550	740	740
		R	78	83	95	100	115	143	172	204	248	264	299	320
		h	85	85	109	102	127	152	203	219	273	279	369	370
		H	227	227	251	281	342	441	545	633	777	781	1082	1082
	PN 25	Weight (Kg)	9.5	10	12	21.5	35	71	118	205	350	370	800	820
		L	124	124	149	159	200	234	277	336	415	419	467	467
		W	165	165	185	207	250	320	390	480	550	550	740	740
		R	78	85	95	105	127	159	191	223	261	293	325	358
		H	227	227	251	287	350	454	558	649	796	801	1099	1099
Weight (Kg)	11	11.5	13.5	23	41	81	138	233	390	425	855	870		

Threaded

Angle Pattern

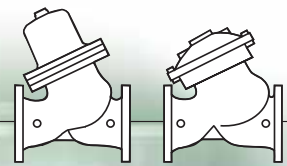
DN	50	65	80
L	121	140	159
W	122	122	163
R	40	48	55
h	83	102	115
H	225	242	294
Weight (Kg)	5.5	7	15

Y Pattern

DN	40	50	65	80
L	155	155	212	250
W	122	122	122	163
h	40	40	48	56
H	201	202	209	264
Weight (Kg)	5.5	5.5	8	17



BERMAD Irrigation



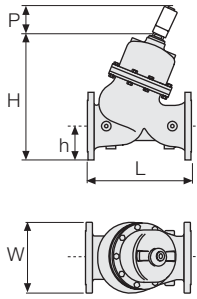
Dimensions & Weights

WW-700 & 800 Series



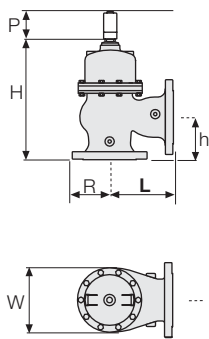
800 Metric

Y Pattern



	mm	40	50	65	80	100	150	200	250	300	350	400	450	500
ISO PN 10; 16	L	205	210	222	250	320	415	500	605	725	733	990	1000	1100
	W	156	166	190	200	229	286	344	408	484	536	600	638	716
	h	78	83	95	100	115	143	172	204	242	268	300	319	358
	H	260	265	278	327	409	526	650	763	942	969	1154	1173	1211
	P	N/A	N/A	N/A	N/A	N/A	135	135	142	154	154	191	191	191
Weight (Kg)	10.7	13	16	28	48	94	162	272	455	482	1000	1074	1096	
ISO PN 25; 40*	L	205	210	222	264	335	433	524	637	762	767	1024	1030	1136
	W	156	166	190	210	254	318	382	446	522	590	650	714	778
	h	78	83	95	105	127	159	191	223	261	295	325	357	389
	H	260	265	278	332	422	542	666	783	961	996	1179	1208	1241
	P	N/A	N/A	N/A	N/A	N/A	135	130	142	154	154	191	191	N/A
Weight (Kg)	11.8	15	18.4	32	56	106	190	307	505	549	1070	1095	1129	

Angle Pattern



	mm	40	50	65	80	100	150	200	250	300	350	400	450
ISO PN 10; 16	L	124	124	149	152	190	225	265	320	396	400	450	450
	W	156	166	190	200	229	285	344	408	496	528	598	640
	R	78	83	95	100	115	143	172	204	248	264	299	320
	h	85	85	109	102	127	152	203	219	273	279	369	370
	H	252	252	271	308	390	476	619	717	911	915	1144	1144
P	N/A	N/A	N/A	N/A	N/A	141	141	156	156	156	195	195	
Weight (Kg)	10.7	13	16	26	46	90	153	259	433	459	950	1020	
ISO PN 25; 40*	L	124	124	149	159	200	234	277	336	415	419	467	467
	W	150	155	190	200	254	318	381	446	522	586	650	716
	R	78	85	95	105	127	159	191	223	261	293	325	358
	h	85	85	109	109	135	165	216	236	294	299	386	386
	H	252	264	271	315	398	491	632	733	930	935	1160	1160
P	N/A	N/A	N/A	N/A	N/A	141	136	156	156	156	195	195	
Weight (Kg)	11.8	15	18.4	30	54	101	179	292	481	523	1017	1051	

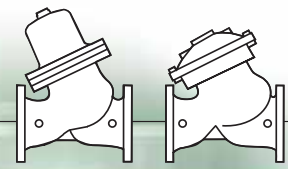


700 & 800 Metric

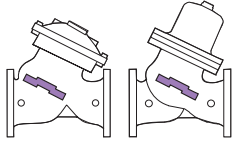
Control Chamber Displacement Volume (liter)

DN	40-65	80	100	150	200	250	300-350	400-500	600-800
700 Series	0.125	0.3	0.45	2.15	4.5	8.5	12.4	29.9	98.0
800 Series	0.04	0.12	0.3	1.1	2.3	4.0	8.0	18.7	-

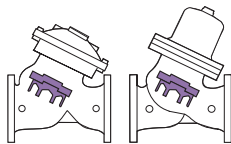
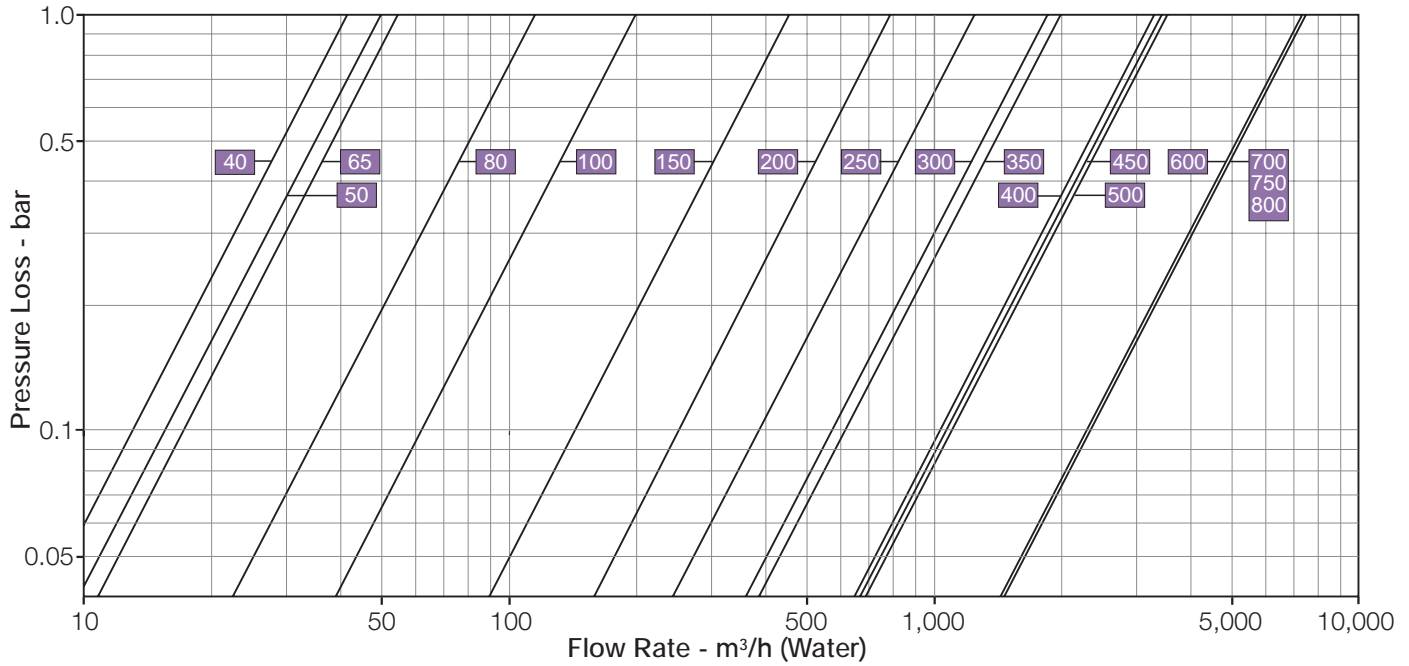




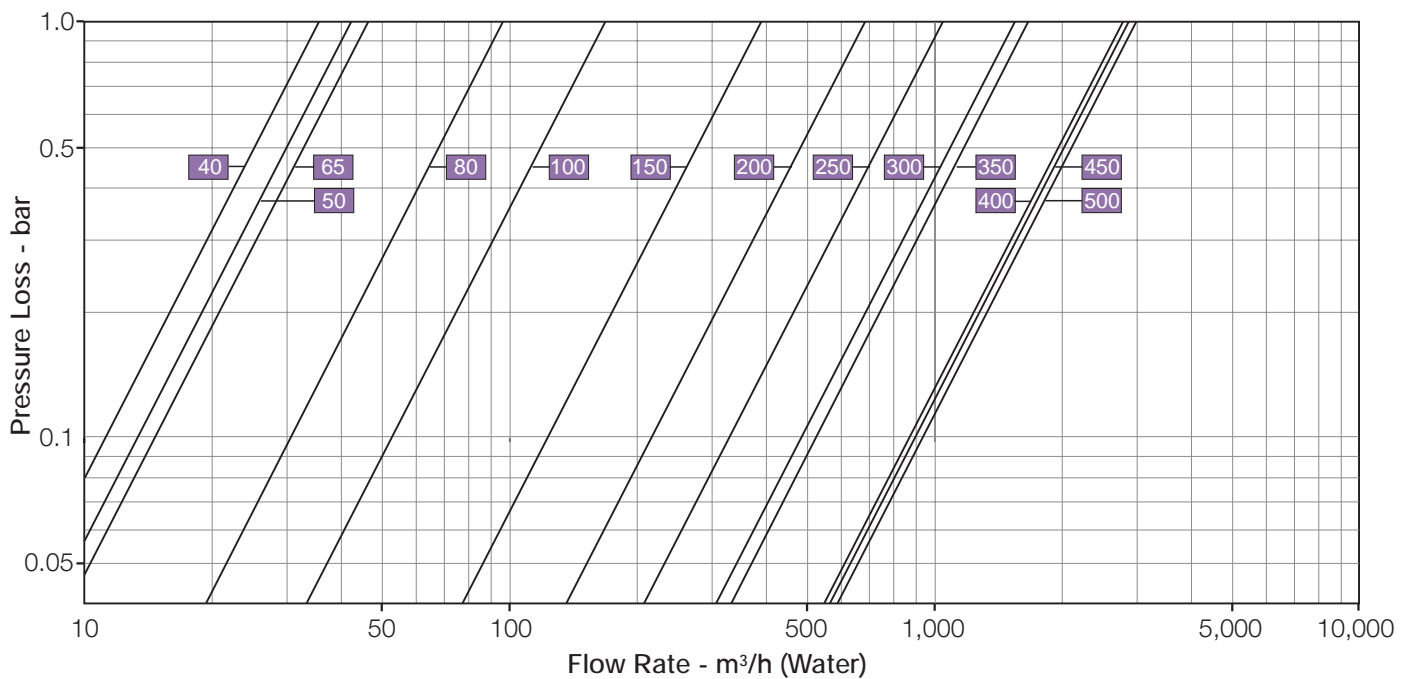
SI Metric

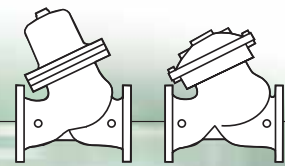


Y Pattern, Flat Disk

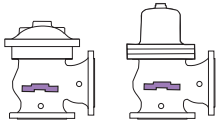


Y Pattern, Throttling Plug (U-Type)

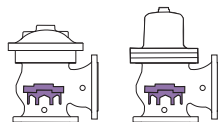
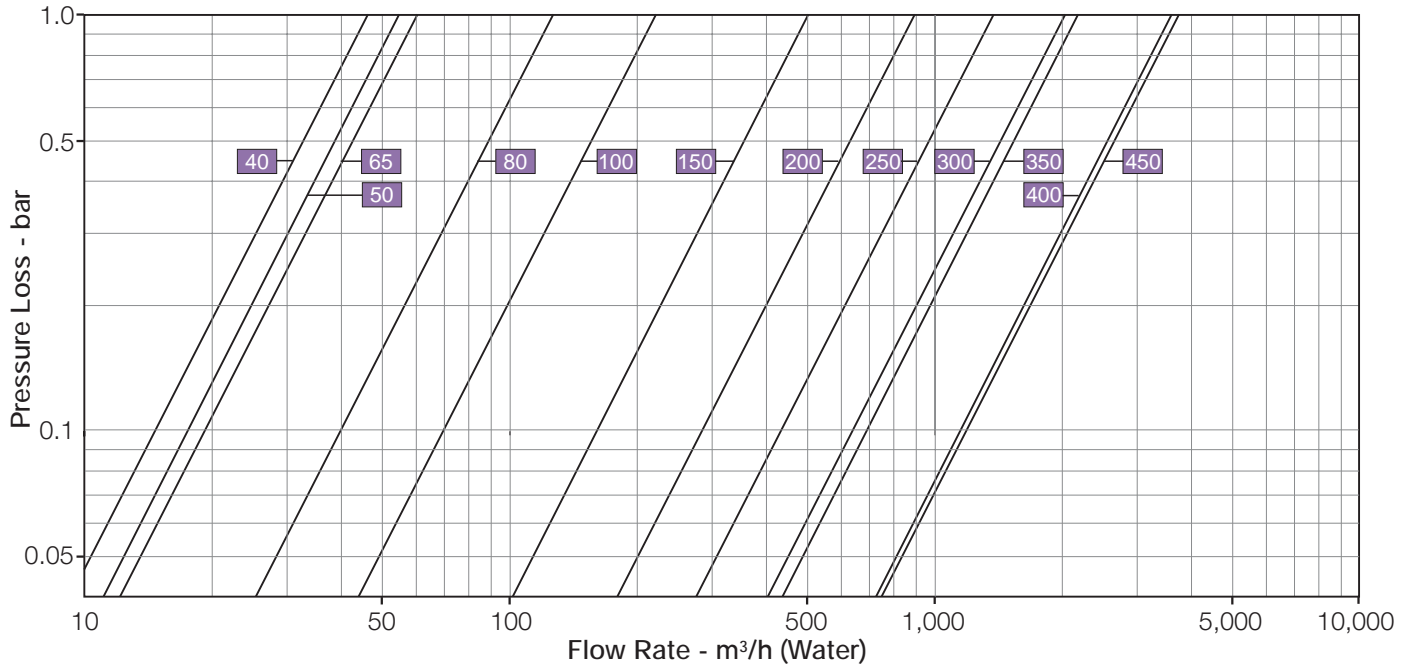




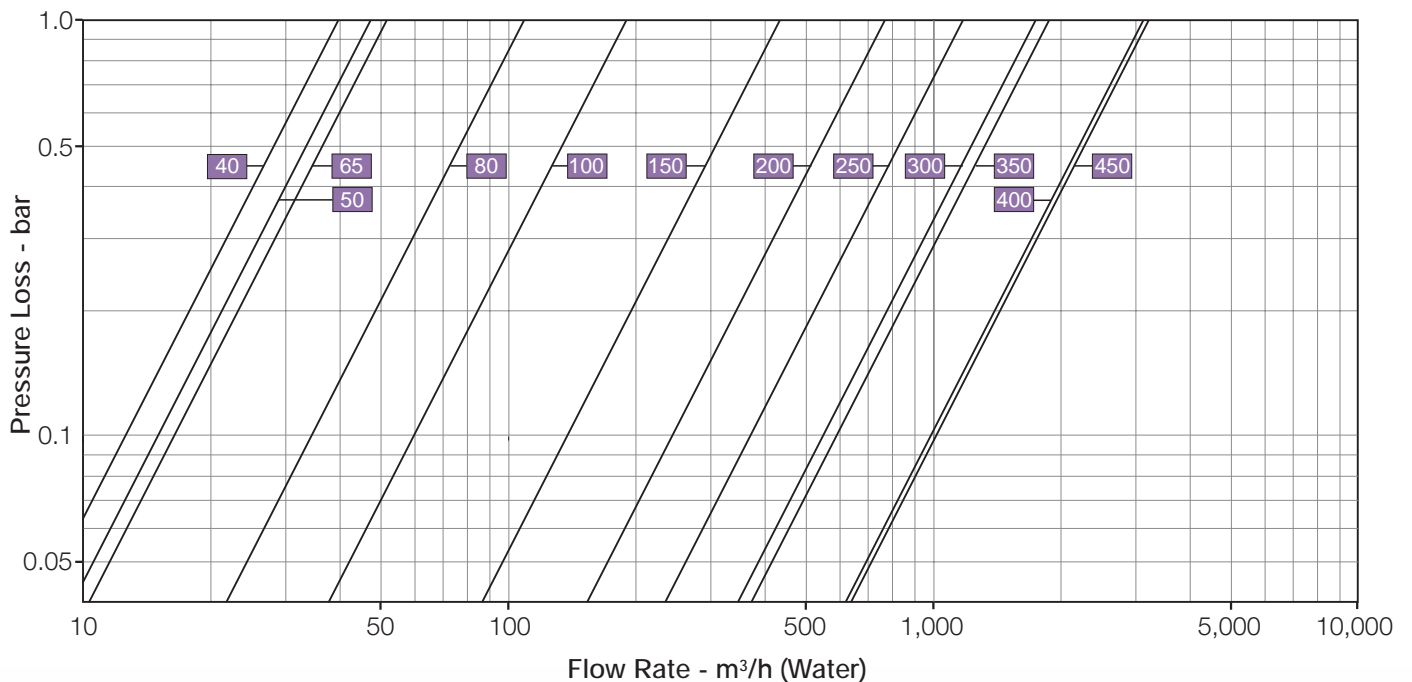
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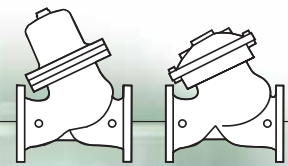


Angle Pattern, Flat Disk

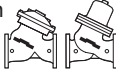
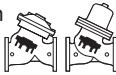
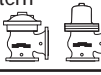
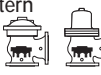


Angle Pattern, Throttling Plug (U-Type)






SI Metric

	mm	40	50	65	80	100	150	200	250	300	350	400	450	500
Y-Pattern Flat Disk 	Kv	42	50	55	115	200	460	815	1,250	1,850	1,990	3,310	3,430	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
	Leq - m	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
Y-Pattern U-Plug 	Kv	36	43	47	98	170	391	693	1,063	1,573	1,692	2,814	2,916	3,018
	K	3.1	5.4	12.8	6.7	5.4	5.2	5.2	5.4	5.1	8.2	5.1	7.6	10.8
	Leq - m	6.0	14.3	46.2	29.9	31.9	51.9	74.6	96.8	118.4	221.3	155.9	283.5	448.1
Angle Pattern Flat Disk 	Kv	46	55	61	127	220	506	897	1,375	2,035	2,189	3,641	3,773	NA
	K	1.9	3.2	7.6	4.0	3.2	3.1	3.1	3.2	3.1	4.9	3.0	4.5	NA
	Leq - m	3.6	8.5	27.6	17.8	19.0	31.0	44.6	57.8	70.7	132.1	93.1	169.3	NA
Angle Pattern U-Plug 	Kv	39	47	51	108	187	430	762	1,169	1,730	1,861	3,095	3,207	NA
	K	2.6	4.5	10.6	5.6	4.5	4.3	4.3	4.5	4.2	6.8	4.2	6.2	NA
	Leq - m	5.0	11.8	38.2	24.7	26.4	42.9	61.7	80.0	97.9	182.9	128.9	234.3	NA

SI Metric

	mm	600	700	750	800
G-Pattern Flat Disk 	Kv	7,350	7,500	7,500	7,500
	K	3.8	6.7	8.8	11.4
	Leq - m	188.0	390.1	550.9	760.7

Valve flow coefficient, Kv or Cv

$$Kv(Cv) = Q \sqrt{\frac{G_f}{\Delta P}}$$

Where:

Kv = Valve flow coefficient (flow in m³/h at 1bar Diff. Press.)

Cv = Valve flow coefficient (flow in gpm at Diff. Press. 1psi)

Q = Flow rate (m³/h ; gpm)

ΔP = Differential pressure (bar ; psi)

G_f = Liquid specific gravity (Water = 1.0)

$$Cv = 1.155 Kv$$

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 ; feet)

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

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

Equivalent Pipe Length, Leq

$$Leq = Lk \cdot D$$

Where:

Leq = Equivalent nominal pipe length (m ; feet)

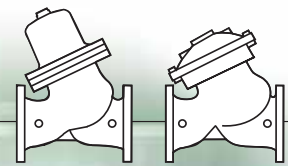
Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)

D = Nominal pipe diameter (m ; feet)

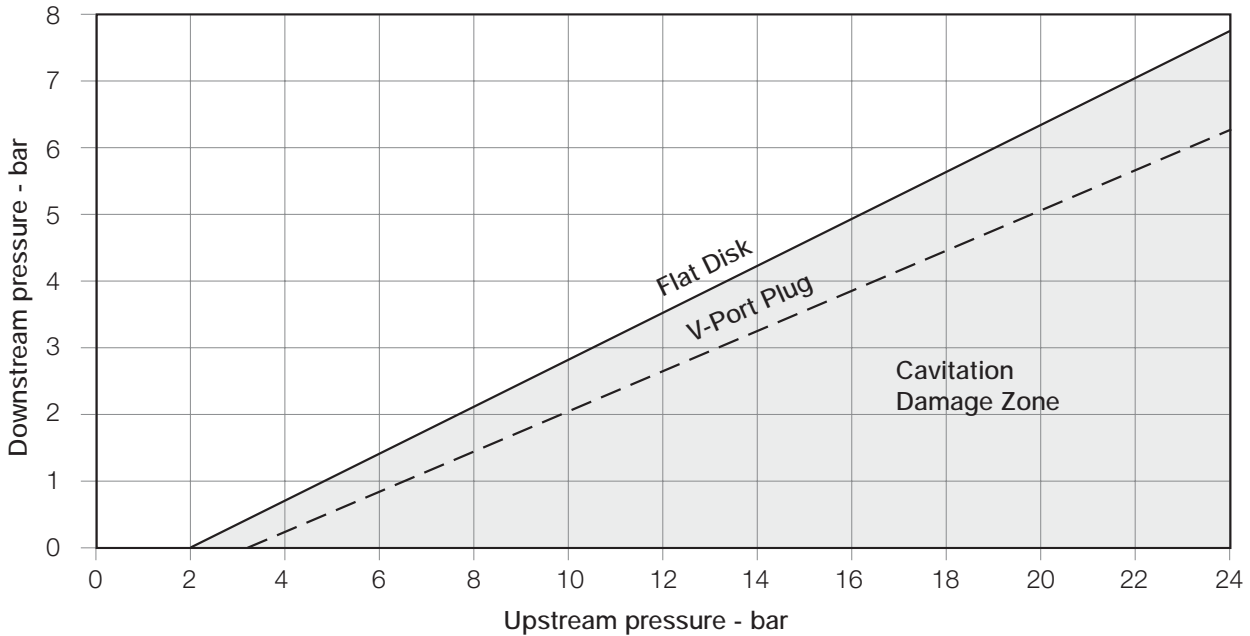
Note:

The Leq values given are for general consideration only.

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



Cavitation Guide



Cavitation

The cavitation phenomenon has a significant affect on control valve and system performance.

Cavitation may damage the valve and piping by the affects of erosion and vibration. Cavitation also generates noise and may limit and ultimately choke the flow.

As the pressure differential across the valve increases, the static pressure of the flow passing through the throttling area of the valve (Vena Contracta) drops sharply.

When the fluid's static pressure reaches liquid vapor pressure, vapor cavities (bubbles) form and grow until they violently implode by the recovered pressure downstream to the valve seat.

The implosion of these cavities generates high-pressure surges, micro jets and intensive heat, which erode valve components and downstream piping. In its final stage, cavitation flashes and chokes the flow.

The above Cavitation Guides for Bermad 700 Series valves are based on the formula commonly used in the valve industry:

$$\sigma = (P2 - Pv) / (P1 - P2)$$

Where:

σ = Sigma, cavitation index, dimensionless

P1 = Upstream pressure, absolute

P2 = Downstream pressure, absolute

Pv = Liquid vapor pressure, absolute

(Water, 18°C = 0.02 bar-a) ; 65°F = 0.3 psi-a)

Use these guides and your applications upstream and downstream pressures to determine whether their intersection lies in or out of the cavitation damage zone.

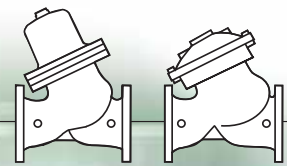
Considerations to avoid cavitation damage:

- A) Reduce system pressure in stages designing each pressure stage to be above cavitation conditions.
- B) Consider using other valve selection criteria
 - a. Valve body and plug type
 - b. Valve size
 - c. Valve material

Notes:

1. An alternate cavitation index formula introduced by ISA is:
 $\sigma_{ISA} = (P1 - Pv) / (P1 - P2)$ which equals $\sigma + 1$
2. The above charts should be considered only as a general guide.
3. For optimum system and control valve application please consult Bermad.





700 English

Available Sizes & Patterns

- 1 1/2" - 20" - Y Pattern
- 1 1/2" - 18" - Angle
- 24" - 32" - Globe

Connection Standard

- Flanged: ANSI B16.42 (Ductile Iron)
- Threaded: NPT or BSP (1 1/2" -3")

Water Temperature

- Up to 180°F

Working pressure

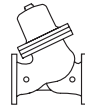
- Class #150: 250 psi
- Class #300: 400 psi

Standard Materials

- **Main valve body and cover**
Ductile Iron to ASTM A-536
- **Main valve internals**
Stainless Steel, Bronze & Epoxy coated Steel
- **Control Trim**
Brass, Bronze accessories
Stainless Steel 316 fittings & tubing
or forged Brass fittings & Copper tubing
- **Elastomers**
NBR
- **Coating**
Blue fusion bonded Epoxy

Optional Materials

- **Main valve body and cover**
Carbon Steel to ASTM A-216-WCB
Stainless Steel 316 to ASTM A-743 CF8M
Nickel Aluminum Bronze to ASTM B-148 C 95800
Other materials on request
- **Control Trim**
Stainless Steel 316, Nickel Aluminum Bronze,
Hastalloy C-276 accessories
Monel fittings & tubing
- **Elastomers**
EPDM
FPM



800 English

Available Sizes & Patterns

- 1 1/2" - 20" - Y Pattern
- 1 1/2" - 18" - Angle

Connection Standard

- Flanged: ANSI B16.5 (Cast steel)

Water Temperature

- Up to 180°F

Working pressure

- Class #150: 250 psi
- Class #300: 400 psi
- Class #400: 600 psi

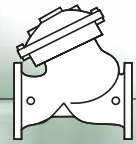
Standard Materials

- **Main valve body**
Carbon Steel to ASTM A-216-WCB
- **Valve cover (piston cylinder)**
Stainless Steel or Bronze
- **Main valve internals**
Stainless Steel and Bronze
- **Control Trim**
Brass, Bronze accessories
Stainless Steel 316 fittings & tubing
or forged Brass fittings & Copper tubing
- **Elastomers**
NBR
- **Coating**
Blue fusion bonded Epoxy

Optional Materials

- **Main valve body and Cover**
Ductile Iron to ASTM A-536
Stainless Steel 316 to ASTM A-743 CF8M
Nickel Aluminum Bronze to ASTM B-148 C 95800
Other materials on request
- **Control Trim**
Stainless Steel 316, Nickel Aluminum Bronze,
Hastalloy C-276 accessories
Monel fittings & tubing
- **Elastomers**
EPDM
FPM

BERMAD Irrigation



Dimensions & Weights

WW-700 Series

US 700 English

Flanged

Y Pattern		inch	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
	ANSI 125 ; 150	L	8.1	8.1	8.3	9.8	12.6	16.3	19.7	23.8	28.5	28.9	39.0	39.4	43.3
		W	6.1	6.1	7.0	7.9	8.8	12.6	15.4	18.9	21.7	21.7	29.1	29.1	29.1
		h	3.1	3.3	3.7	3.9	4.5	5.6	6.8	8.0	9.5	10.6	11.8	12.6	14.1
		H	9.4	9.6	10.1	12.0	14.4	19.4	23.0	28.5	33.1	34.1	43.6	44.4	45.9
		Weight (lb)	20	23	29	49	82	165	276	478	816	840	1865	2083	2121
	ANSI 250 ; 300	L	8.1	8.3	8.7	10.4	13.2	17.0	20.6	25.1	30.0	30.2	40.3	40.5	44.7
		W	6.1	6.5	7.3	8.1	9.8	12.6	15.4	18.9	21.7	22.4	29.1	29.1	29.5
		h	3.1	3.3	3.7	4.1	5.0	6.3	7.5	8.8	10.3	11.6	12.8	14.1	15.3
		H	9.4	9.6	10.1	12.4	14.9	20.0	23.7	29.2	33.8	35.2	44.6	45.9	47.1
		Weight (lb)	22	27	33	55	95	187	322	540	904	957	1984	2132	2174

Globe Pattern		inch	24"	28"	30"	32"
	ANSI 125 ; 150	L	57	65	70	73
		W	49	49	49	49
		h	18.5	19	20.5	21.8
		H	77	78	79.3	80.6
		Weight (lb)	7150	8140	8580	9020
	ANSI 250 ; 300	L	59	65	70	73
		W	49	49	49	49
		h	18.5	19	20.5	21.8
		H	77	78	79.3	80.6
		Weight (lb)	7700	8140	8580	9020

Angle Pattern		inch	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"
	ANSI 125 ; 150	L	4.9	4.9	5.9	6.0	7.5	8.9	10.4	12.6	15.6	15.7	17.7	17.7
		W	6.1	6.1	7.0	7.9	8.7	12.6	15.4	18.9	21.7	21.7	29.1	29.1
		R	3.1	3.3	3.7	3.9	4.5	5.6	6.8	8.0	9.8	10.4	11.8	12.6
		h	3.3	3.3	4.3	4.0	5.0	6.0	8.0	8.6	10.7	11.0	14.5	14.5
		H	8.9	8.9	9.9	11.1	13.5	17.4	21.5	24.9	30.6	30.7	42.6	42.6
	ANSI 250 ; 300	L	4.9	4.9	5.9	6.3	7.9	9.2	10.9	13.2	16.3	16.5	18.4	18.4
		W	6.5	6.5	7.3	8.1	9.8	12.6	15.4	18.9	21.7	21.7	29.1	29.1
		R	3.1	3.3	3.7	4.1	5.0	6.3	7.5	8.8	10.3	11.5	12.8	14
		h	3.3	3.3	4.3	4.3	5.3	6.5	8.5	9.3	11.6	11.8	15.2	15.2
		H	8.9	8.9	9.9	11.3	13.8	17.9	22.0	25.6	31.3	31.5	43.3	43.3
Weight (lb)	24	25	30	51	90	179	304	514	860	937	1885	1918		

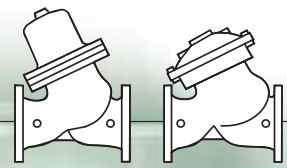
Threaded

Angle Pattern		inch	2"	2 1/2"	3"
	BSP ; NPT	L	4.8	5.5	6.3
		W	4.8	4.8	6.4
		R	1.6	1.9	2.2
		h	3.3	4.0	4.5
		H	8.9	9.5	11.6
Weight (lb)	12	15	33		

Y Pattern		inch	1 1/2"	2"	2 1/2"	3"
	BSP ; NPT	L	6.1	6.1	8.3	9.8
		W	4.8	4.8	4.8	6.4
		h	1.6	1.6	8.2	2.2
		H	7.9	8.0	8.2	10.4
		Weight (lb)	12	12	18	37



BERMAD Irrigation

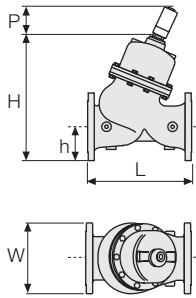


Dimensions & Weights

WW-700 & 800 Series

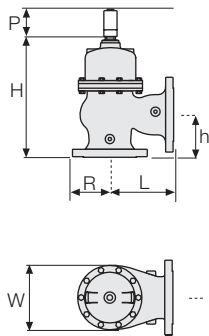
US 800 English

Y Pattern



	inch	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
ANSI 150	L	8.1	8.1	8.3	9.8	12.6	16.3	19.7	23.8	28.5	28.9	39.0	39.4	43.3
	W	6.1	6.1	7.0	7.9	8.8	12.6	15.4	18.9	21.7	21.7	29.1	29.1	29.1
	h	3.1	3.3	3.7	3.9	4.5	5.6	6.8	8.0	9.5	10.6	11.8	12.6	14.1
	H	10.2	10.4	10.9	12.9	16.1	20.7	25.6	30	37.1	38.1	45.4	46.2	47.7
	P	N/A	N/A	N/A	N/A	N/A	5.3	5.3	5.6	6.1	6.1	7.5	7.5	7.5
	Weight (lb)	24	29	35	62	106	207	356	598	1001	1060	2200	2363	2411
ANSI 300	L	8.1	8.3	8.7	10.4	13.2	17.0	20.6	25.1	30.0	30.2	40.3	40.5	44.7
	W	6.1	6.5	7.3	8.1	9.8	12.6	15.4	18.9	21.7	22.4	29.1	29.1	29.5
	h	3.1	3.3	3.7	4.1	5.0	6.3	7.5	8.8	10.3	11.6	12.8	14.1	15.3
	H	10.2	10.4	10.9	13.1	16.6	21.3	26.2	30.8	37.8	39.2	46.4	47.6	48.9
	P	N/A	N/A	N/A	N/A	N/A	5.3	5.3	5.6	6.1	6.1	7.5	7.5	7.5
	Weight (lb)	26	33	40	70	123	233	418	675	1111	1208	2354	2409	2484

Angle Pattern

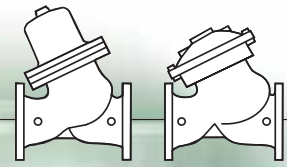


	inch	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"
ANSI 150	L	4.9	4.9	5.9	6.0	7.5	8.9	10.4	12.6	15.6	15.7	17.7	17.7
	W	6.1	6.1	7.0	7.9	8.7	12.6	15.4	18.9	21.7	21.7	29.1	29.1
	R	3.1	3.3	3.7	3.9	4.5	5.6	6.8	8.0	9.8	10.4	11.8	12.6
	h	3.3	3.3	4.3	4.0	5.0	6.0	8.0	8.6	10.7	11.0	14.5	14.5
	H	9.9	10.4	10.7	12.1	15.4	18.7	24.4	28.2	35.9	36.0	45.0	45.0
	P	N/A	N/A	N/A	N/A	N/A	5.6	5.6	6.1	6.1	6.1	7.7	7.7
Weight (lb)	24	29	35	57	101	198	337	570	953	1010	2090	2244	
ANSI 300	L	4.9	4.9	5.9	6.3	7.9	9.2	10.9	13.2	16.3	16.5	18.4	18.4
	W	6.5	6.5	7.3	8.1	9.8	12.6	15.4	18.9	21.7	21.7	29.1	29.1
	R	3.1	3.3	3.7	4.1	5.0	6.3	7.5	8.8	10.3	11.5	12.8	14
	h	3.3	3.3	4.3	4.3	5.3	6.5	8.5	9.3	11.6	11.8	15.2	15.2
	H	9.9	10.4	10.7	12.4	15.7	19.3	24.9	28.9	36.6	36.8	45.7	45.7
	P	N/A	N/A	N/A	N/A	N/A	5.6	25.6	6.1	6.1	6.1	7.7	7.7
Weight (lb)	26	33	40	66	119	222	394	642	1058	1151	2237	2312	

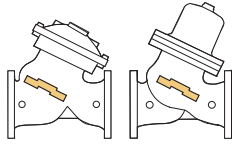
US 700 & 800 English

Control Chamber Displacement Volume (gallon)

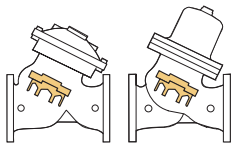
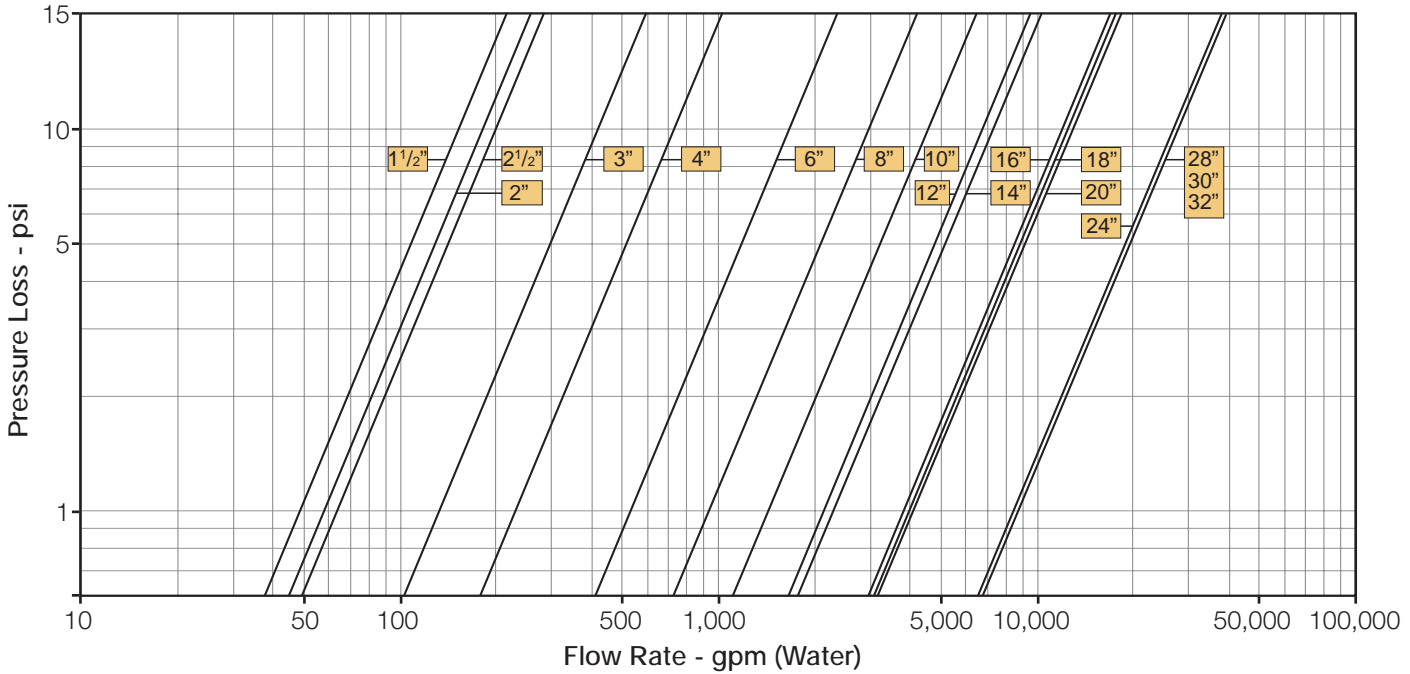
Sizes	1 1/2"-2 1/2"	3"	4"	6"	8"	10"	12"-14"	16"-20"	24"-32"
700 Series	0.04	0.08	0.12	0.57	1.19	2.25	3.28	7.88	25.9
800 Series	0.01	0.03	0.08	0.29	0.61	1.06	2.12	4.95	-



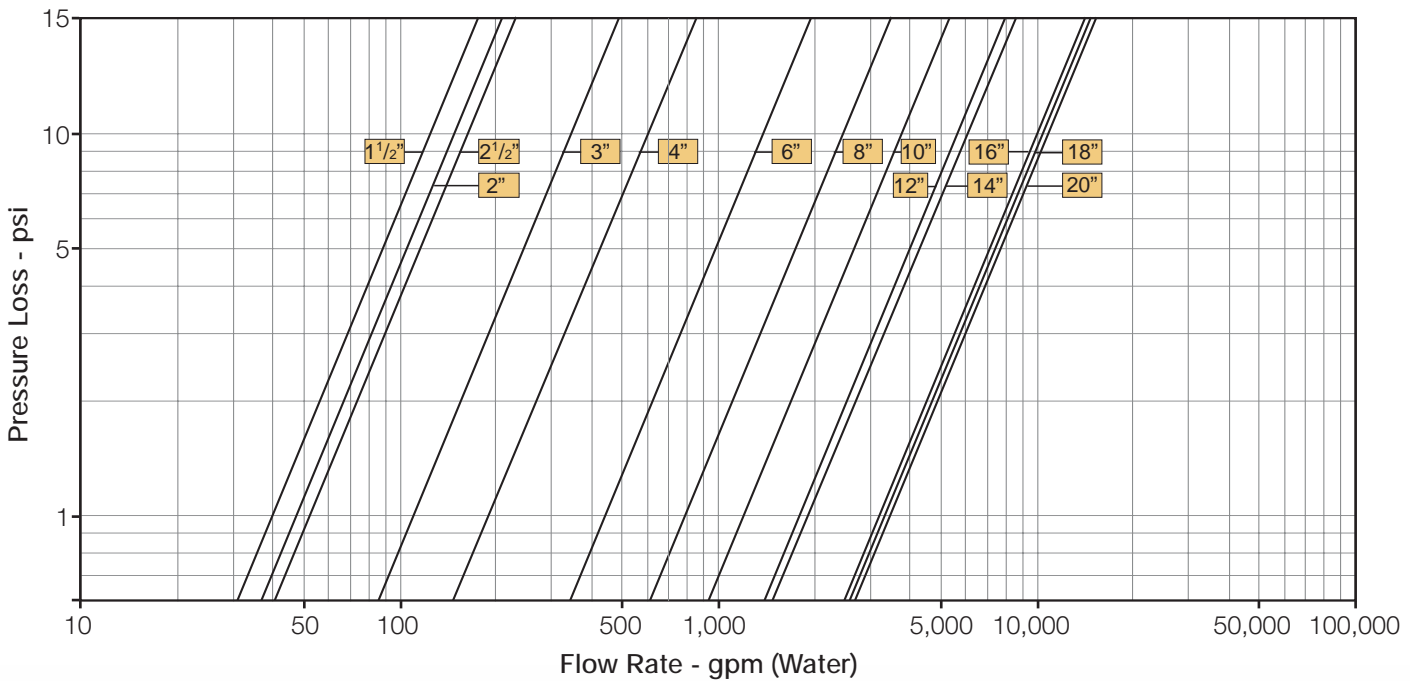
US English

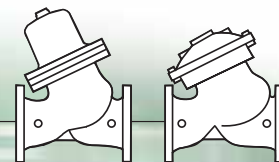


Y Pattern, Flat Disk

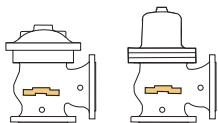


Y Pattern, Throttling Plug (U-Type)

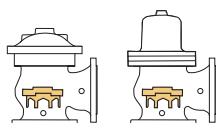
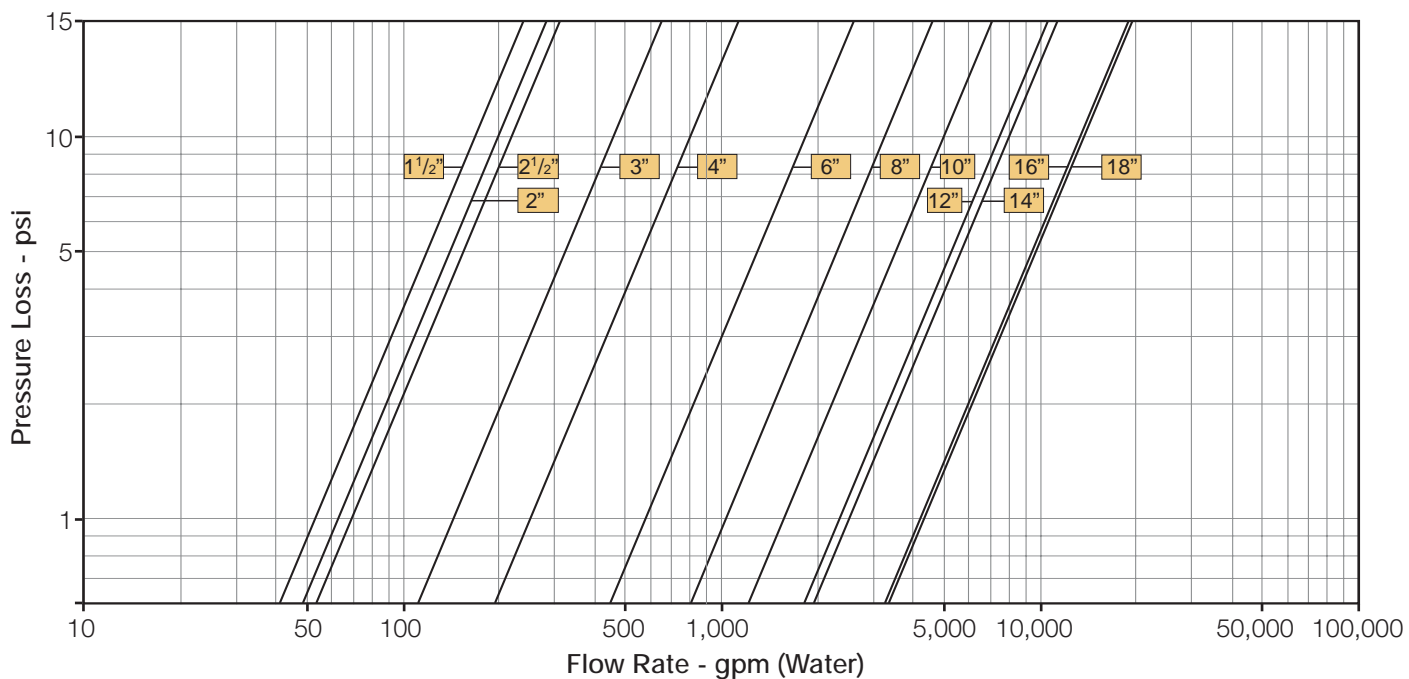




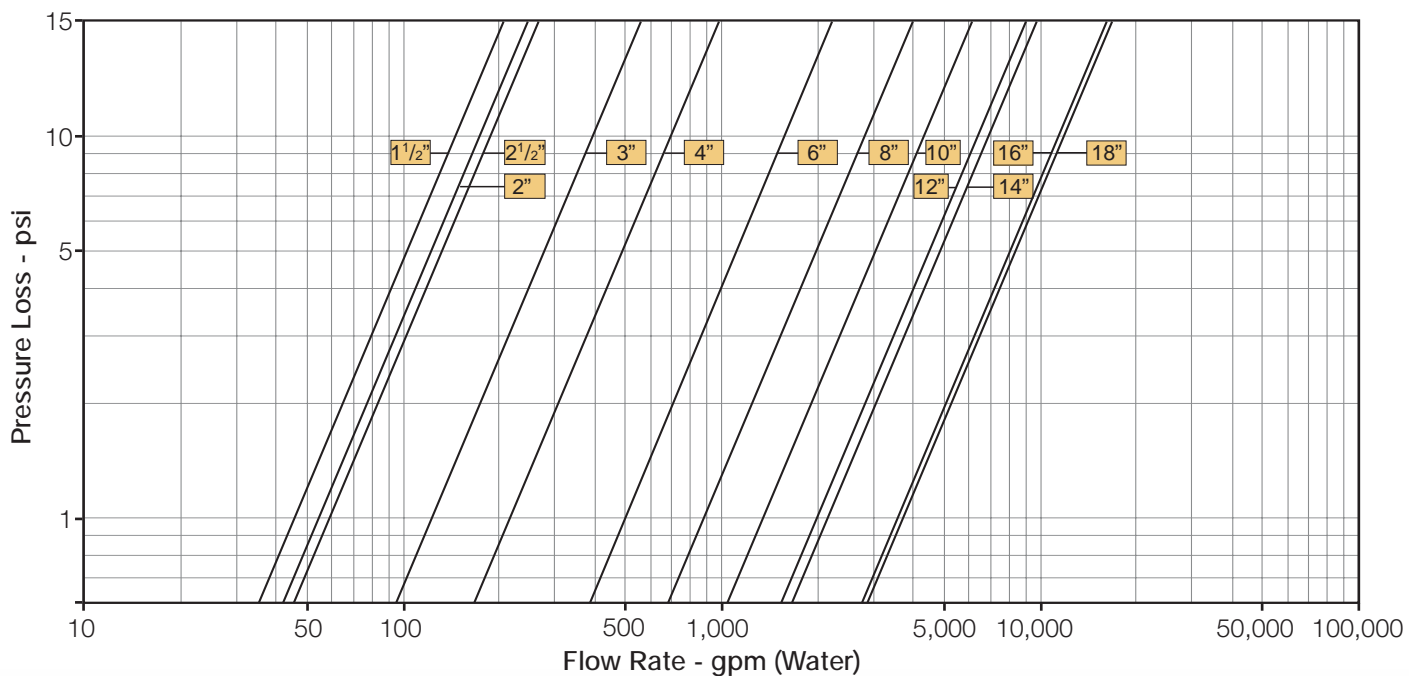
US English



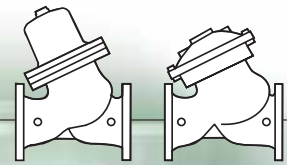
Angle Pattern, Flat Disk



Angle Pattern, Throttling Plug (U-Type)





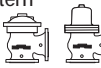
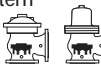
BERMAD Irrigation




Flow Properties

WW-700 & 800 Series

US English

	inch	1.5"	2"	2.5"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
Y-Pattern Flat Disk 	Cv	49	58	64	133	230	530	940	1,440	2,140	2,300	3,820	3,960	4,100
	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
	Leq-feet	14.2	33.8	109.5	70.8	75.6	123.0	176.9	229.5	280.8	524.5	369.6	671.9	1,062.3
Y-Pattern U-Plug 	Cv	41	49	54	113	200	450	800	1,230	1,820	1,950	3,250	3,370	3,490
	K	3.1	5.4	12.8	6.7	5.4	5.2	5.2	5.4	5.1	8.2	5.1	7.6	10.8
	Leq-feet	19.7	46.8	151.6	97.9	104.6	170.2	244.8	317.6	388.6	725.9	511.6	930.0	1,470.3
Angle Pattern Flat Disk 	Cv	53	64	70	146	250	580	1,040	1,590	2,350	2,530	4,210	4,360	NA
	K	1.9	3.2	7.6	4.0	3.2	3.1	3.1	3.2	3.1	4.9	3.0	4.5	NA
	Leq-feet	11.7	28.0	90.5	58.5	62.5	101.6	146.2	189.7	232.0	433.4	305.5	555.3	NA
Angle Pattern U-Plug 	Cv	45	54	59	124	220	500	880	1,350	2,000	2,150	3,580	3,710	NA
	K	2.6	4.5	10.6	5.6	4.5	4.3	4.3	4.5	4.2	6.8	4.2	6.2	NA
	Leq-feet	16.3	38.7	125.3	80.9	86.5	140.7	202.4	262.5	321.2	599.9	422.8	768.6	NA

US English

	inch	24"	28"	30"	32"
G-Pattern Flat Disk 	Cv	8,490	8,670	8,670	8,670
	K	3.8	6.7	8.8	11.4
	Leq-feet	616.6	1,280.0	1,807.3	2,495.6

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 Diff. Press.)
- Cv = Valve flow coefficient (flow in gpm at Diff. Press. 1psi)
- Q = Flow rate (m³/h ; gpm)
- ΔP = Differential pressure (bar ; psi)
- Gf = Liquid specific gravity (Water = 1.0)

$$Cv = 1.155 Kv$$

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 ; feet)
- V = Nominal size flow velocity (m/sec ; feet/sec.)
- g = Acceleration of gravity (9.81 m/sec² ; 32.18 feet/sec²)

Equivalent Pipe Length, Leq

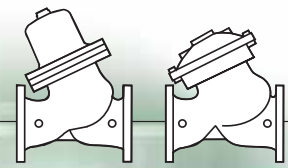
$$Leq = Lk \cdot D$$

Where:

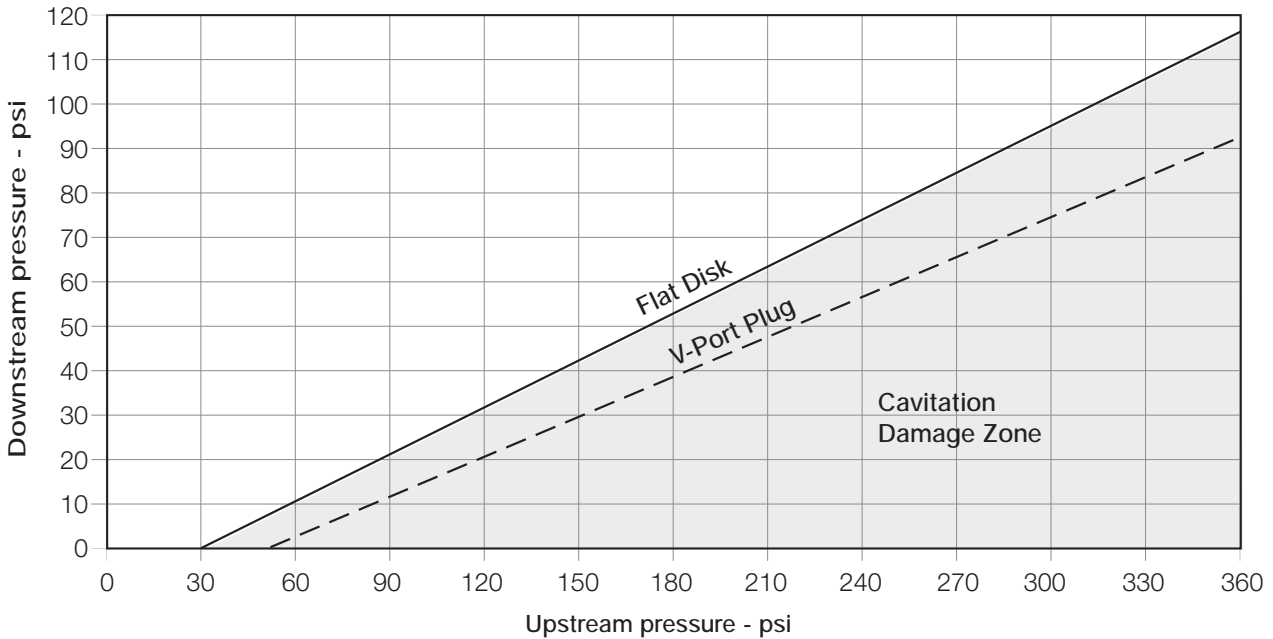
- Leq = Equivalent nominal pipe length (m ; feet)
- Lk = Equivalent length coefficient for turbulent flow in clean commercial steel pipe (SCH 40)
- D = Nominal pipe diameter (m ; feet)

Note:

The Leq values given are for general consideration only. Actual Leq may vary somewhat with each of the valve sizes.



Cavitation Guide



Cavitation

The cavitation phenomenon has a significant affect on control valve and system performance.

Cavitation may damage the valve and piping by the affects of erosion and vibration. Cavitation also generates noise and may limit and ultimately choke the flow.

As the pressure differential across the valve increases, the static pressure of the flow passing through the throttling area of the valve (Vena Contracta) drops sharply.

When the fluid's static pressure reaches liquid vapor pressure, vapor cavities (bubbles) form and grow until they violently implode by the recovered pressure downstream to the valve seat.

The implosion of these cavities generates high-pressure surges, micro jets and intensive heat, which erode valve components and downstream piping. In its final stage, cavitation flashes and chokes the flow.

The above Cavitation Guides for Bermad 700 Series valves are based on the formula commonly used in the valve industry:

$$\sigma = (P_2 - P_v) / (P_1 - P_2)$$

Where:

σ = Sigma, cavitation index, dimensionless

P1 = Upstream pressure, absolute

P2 = Downstream pressure, absolute

Pv = Liquid vapor pressure, absolute

(Water, 18°C = 0.02 bar-a) ; 65°F = 0.3 psi-a)

Use these guides and your applications upstream and downstream pressures to determine whether their intersection lies in or out of the cavitation damage zone.

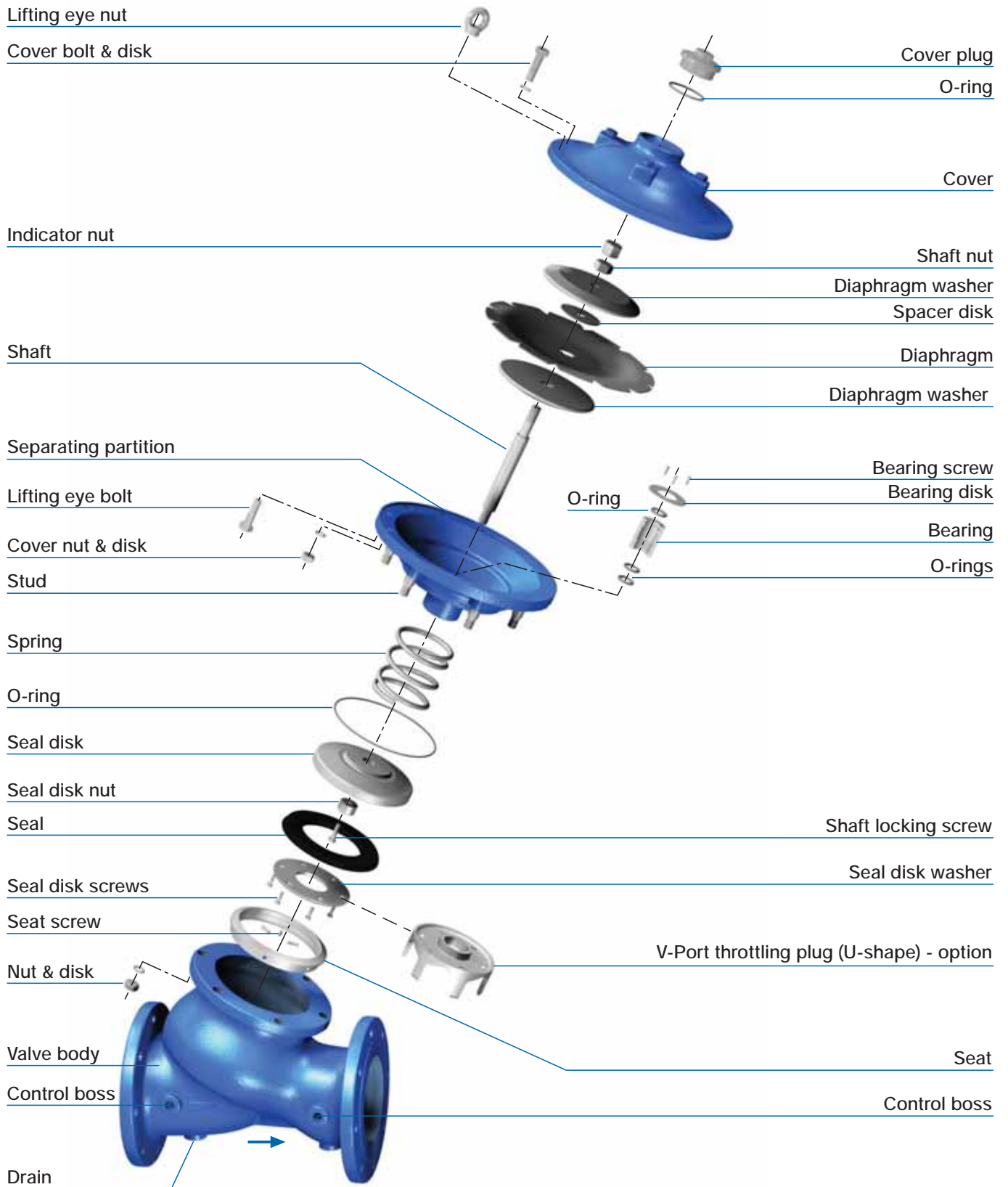
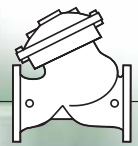
Considerations to avoid cavitation damage:

- A) Reduce system pressure in stages designing each pressure stage to be above cavitation conditions.
- B) Consider using other valve selection criteria
 - a. Valve body and plug type
 - b. Valve size
 - c. Valve material

Notes:

1. An alternate cavitation index formula introduced by ISA is:
 $\sigma_{ISA} = (P_1 - P_v) / (P_1 - P_2)$ which equals $\sigma + 1$
2. The above charts should be considered only as a general guide.
3. For optimum system and control valve application please consult Bermad.



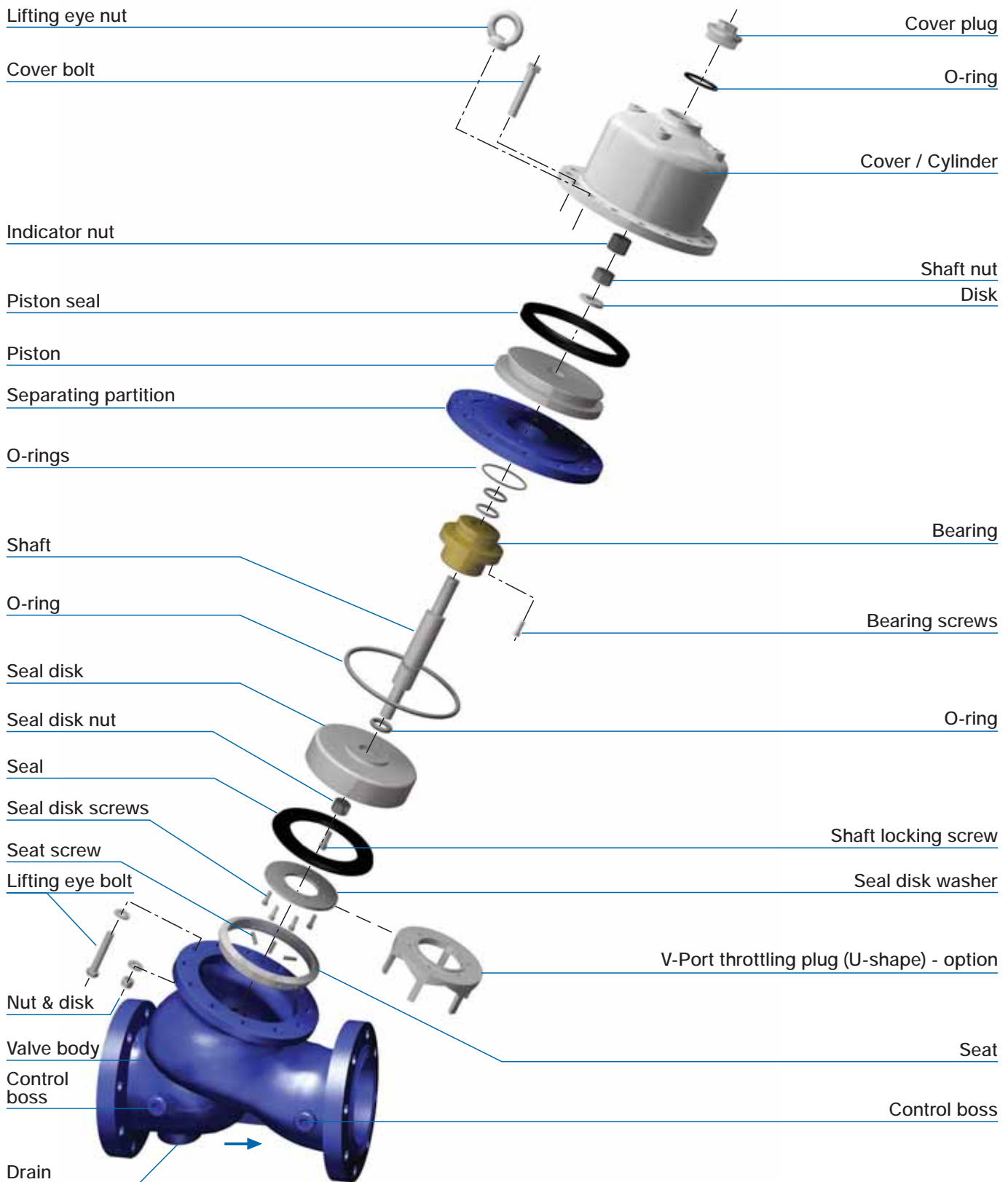
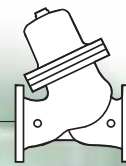


For spare parts ordering, Please use BERMAD "Spare Parts Ordering Guide"

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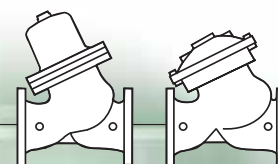


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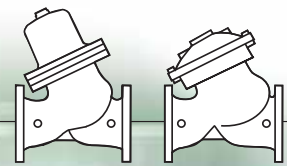
Standard Operation Pressure – Materials Data

End Connections Standards / Pressure Ratings / Materials / Max. Operating Pressure

Bermad Code	End Connections Standard	Pressure Class	Ductile iron to ASTM A-536 or EN 1563	Carbon steel to ASTM A-216-WCB or EN 10083-1	Stainless steel 316 to ASTM A-743 CF8M or EN 10088-1	Nickel aluminum bronze to ASTM B-148 C 95800 or BS-EN 1400 AB-2
10 or E1	ISO	PN 10	+	+	+	+
16 or E6	ISO	PN 16	+	+	+	16 bar
25 or E5	ISO	PN 25	25 bar	25 bar	25 bar	25 bar
40	ISO	PN 40 *	-	40 bar	40 bar	-
A5	ANSI	# 150	250 psi	285 psi	285 psi	250 psi
A3	ANSI	# 300	400 psi	400 psi	400 psi	400 psi
A4	ANSI	# 400 *	-	600 psi	600 psi	-
BD	BS 10	Table D	+	+	+	+
BH	BS 10	Table H	400 psi	400 psi	400 psi	400 psi
J1	JIS	10 K	+	+	+	+
J6	JIS	16 K	27 bar	27 bar	27 bar	27 bar
J2	JIS	20 K	28 bar	28 bar	28 bar	28 bar
J3	JIS	30 K *	-	40 bar	40 bar	-
B1	ABNT	10	+	+	+	+
B6	ABNT	16	+	+	+	16 bar
B2	ABNT	25	25 bar	25 bar	25 bar	25 bar
	Threads					
BP	B S P (Rp ISO 7/1)					
PH	B S P (Rp ISO 7/1)		25 bar	25 bar	25 bar	25 bar
NP	N P T					
NH	N P T		400 psi	400 psi	400 psi	400 psi

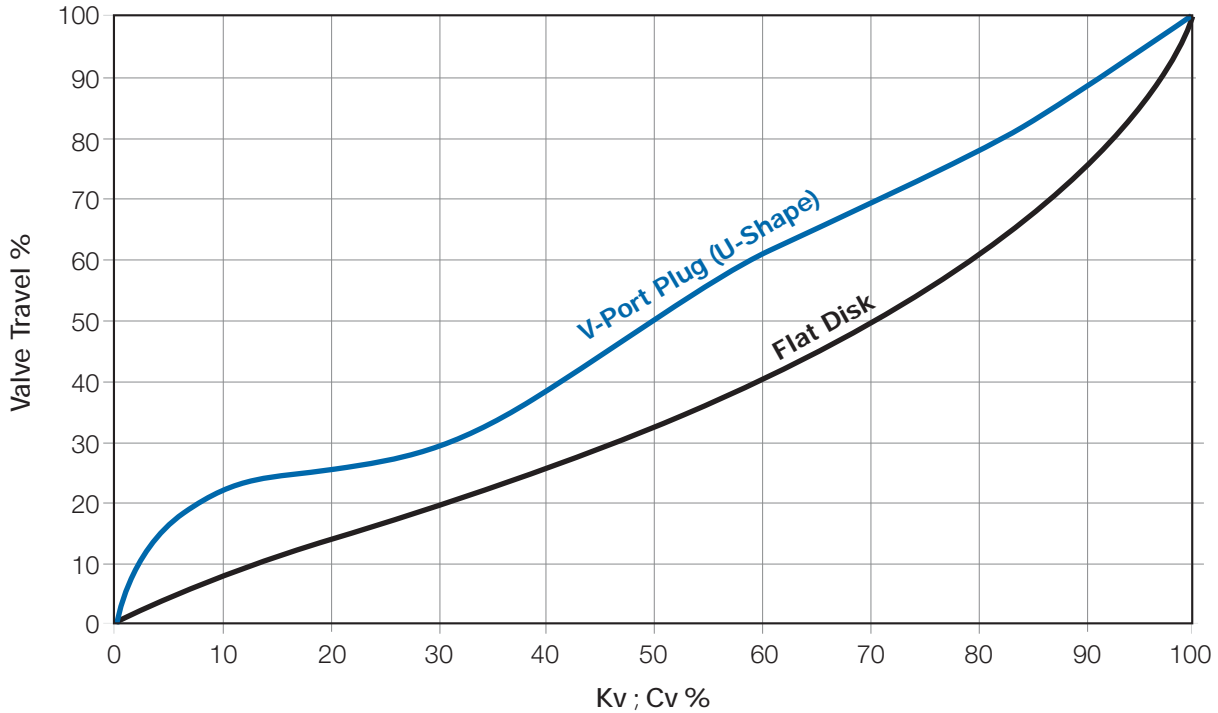
* External flange diameter might vary then the standard.
Can be used in 800 series only.

+ Available, Not required by the standard pressure class
- Not available



Valve Plugs Characteristics

Kv ; Cv to Valve Opening Chart



Typical Pressure Reducing Performance Chart

Actual Hydraulic Laboratory Results

