

Basic Valve

The basic Model 700/705 diaphragm-actuated and the 800/805 piston-actuated valves are hydraulically-operated, globe valves in either the standard oblique (Y) or angle pattern design. Each valve comprises two major components: the body-seat assembly and the actuator assembly.

The actuator assembly is unitized and is removable from the body as an integral unit. It consists of both an upper and a lower control-chamber. Each basic valve can easily be configured, on-site, either as a single-chamber control valve (Model 705/805), or a double-chamber control valve (Model 700/800). The shaft sub-assembly, in both single and double-chambered versions is center-guided, providing an unobstructed seat area.

The Model 700/800 Basic double-chambered valve operation is independent of valve differential pressure since the line pressure actually serves as the actuator differential pressure. This develops maximum power, ensuring immediate valve response. The upper control-chamber is pressurized to close, and vented to open the valve. The lower control-chamber is usually vented to the atmosphere, but can also be pressurized to power the valve open.

The Model 705/805 Basic Valve uses valve differential pressure to power the actuator open or closed. The lower control-chamber, which serves to cushion the closing of the valve, is exposed to the downstream pressure, through a fixed orifice connected to the downstream side of the valve. The pressure in the upper control-chamber varies, usually resulting from the combined action of a regulating pilot and a fixed orifice. This varying pressure modulates the valve to open or close.

The Basic Hydraulic Valve is available in a wide range of materials, sizes, pressure ratings, and end connections. Single or double-chambered versions are used as the main valve in all 700 and 800 Series applications.



Diaphragm Actuated Valve



Piston Actuated Valve



SI

700 Metric

Series Patterns and Sizes

- 700-ES Series – "Y" Pattern – DN40-500
- 700-EN Series – "Y" Pattern – DN50-300
- 700 Series – "Y" Pattern – DN40-500
- 700 Series – Angle – DN40-450
- 700-M6 Series – Globe – DN600-900

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

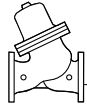
- ISO PN 16: 16 bar
- ISO PN 25: 25 bar

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

Series Patterns and Sizes

- 800 Series – "Y" Pattern – DN40-500
- 800 Series – Angle – DN40-450

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

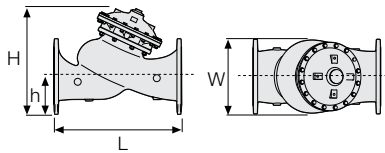
- **Main valve body and Cover**
Ductile Iron to EN 1563
Stainless Steel 316 to EN 10088-1
Nickel Aluminum Bronze to BS-EN 1400 AB-2
Other materials on request
- **Control Trim**
Stainless Steel 316, Nickel Aluminum Bronze,
Hastalloy C-276 accessories
Monel fittings & tubing
- **Elastomers**
EPDM
FPM



SI 700 Metric

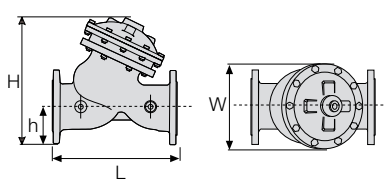
Flanged

700-ES



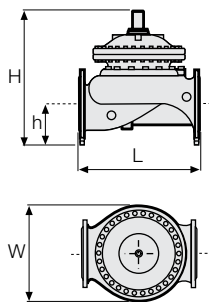
DN	40	50	65	80	100	125	150	200	250	300	400	500	
PN 10; 16; 25	L (mm)	230	230	290	310	350	400	480	600	730	850	1,100	1,250
	W (mm)	150	165	185	200	235	270	300	360	425	530	626	838
	h (mm)	80	90	100	105	125	142	155	190	220	250	320	385
	H (mm)	240	250	250	260	320	375	420	510	605	725	895	1,185
	Weight (Kg)	10	10.8	13.2	15	26	40	55	95	148	255	436	1,061

700-EN



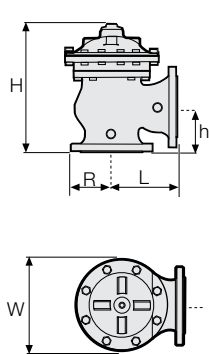
DN	50	80	100	150	200	250	300	
PN 10; 16; 25	L (mm)	230	310	350	480	600	730	850
	W (mm)	165	200	235	320	390	480	550
	h (mm)	82.5	100	118	150	180	213	243
	H (mm)	244	305	369	500	592	733	841
	Weight (Kg)	9.7	21	31	70	115	198	337

700-M6



DN	600	700	750	800	900	
ISO PN 10; 16	L (mm)	1,450	1,650	1,750	1,850	1,850
	W (mm)	1,250	1,250	1,250	1,250	1,250
	h (mm)	470	490	520	553	600
	H (mm)	1,965	1,985	2,015	2,048	2,095
	Weight (Kg)	3,250	3,700	3,900	4,100	4,250
ISO PN 20; 25	L (mm)	1,500	1,650	1,750	1,850	1,850
	W (mm)	1,250	1,250	1,250	1,250	1,250
	h (mm)	470	490	520	553	600
	H (mm)	1,965	1,985	2,015	2,048	2,095
	Weight (Kg)	3,500	3,700	3,900	4,100	4,250

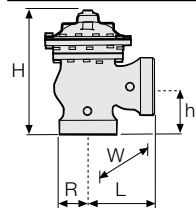
700 Angle



DN	40	50	65	80	100	150	200	250	300	350	400	450	
PN 10; 16	L (mm)	124	124	149	152	190	225	265	320	396	400	450	450
	W (mm)	155	155	178	200	222	320	390	480	550	550	740	740
	R (mm)	78	83	95	100	115	143	172	204	248	264	299	320
	h (mm)	85	85	109	102	127	152	203	219	273	279	369	370
	H (mm)	227	227	251	281	342	441	545	633	777	781	1,082	1,082
	Weight (Kg)	9.5	10	12	21.5	35	71	118	205	350	370	800	820
PN 25	L (mm)	124	124	149	159	200	234	277	336	415	419	467	467
	W (mm)	165	165	185	207	250	320	390	480	550	550	740	740
	R (mm)	78	85	95	105	127	159	191	223	261	293	325	358
	h (mm)	85	85	109	109	135	165	216	236	294	299	386	386
	H (mm)	227	227	251	287	350	454	558	649	796	801	1,099	1,099
	Weight (Kg)	11	11.5	13.5	23	41	81	138	233	390	425	855	870

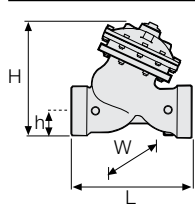
Threaded

700 Angle

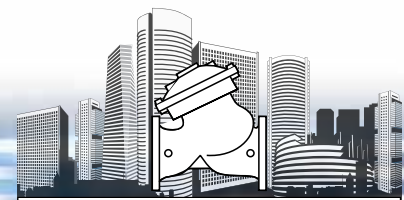


DN	50	65	80	
BSP; NPT	L (mm)	121	140	159
	W (mm)	122	122	163
	R (mm)	40	48	55
	h (mm)	83	102	115
	H (mm)	225	242	294
	Weight (Kg)	5.5	7	15

700 "Y" Pattern



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



SI 700 Metric

Flanged

700 Y Pattern

		DN	40	50	65	80	100	150	200	250	300	350	400	450	500
	ISO PN 10; 16	L (mm)	205	210	222	250	320	415	500	605	725	733	990	1,000	1,100
		W (mm)	155	165	178	200	223	320	390	480	550	550	740	740	740
		h (mm)	78	83	95	100	115	143	172	204	242	268	300	319	358
		H (mm)	239	244	257	305	366	492	584	724	840	866	1,108	1,127	1,167
		Weight (Kg)	9.1	10.6	13	22	37	75	125	217	370	381	846	945	962
	ISO PN 20; 25	L (mm)	205	210	222	264	335	433	524	637	762	767	1,024	1,030	1,136
		W (mm)	155	165	185	207	250	320	390	480	550	570	740	740	750
		h (mm)	78	83	95	105	127	159	191	223	261	295	325	357	389
		H (mm)	239	244	257	314	378	508	602	742	859	893	1,133	1,165	1,197
		Weight (Kg)	10	12.2	15	25	43	85	146	245	410	434	900	967	986

700-M6

		DN	600	700	750	800	900
	ISO PN 10; 16	L (mm)	1,450	1,650	1,750	1,850	1,850
		W (mm)	1,250	1,250	1,250	1,250	1,250
		h (mm)	470	490	520	553	600
		H (mm)	1,965	1,985	2,015	2,048	2,095
		Weight (Kg)	3,250	3,700	3,900	4,100	4,250
	ISO PN 20; 25	L (mm)	1,500	1,650	1,750	1,850	1,850
		W (mm)	1,250	1,250	1,250	1,250	1,250
		h (mm)	470	490	520	553	600
		H (mm)	1,965	1,985	2,015	2,048	2,095
		Weight (Kg)	3,500	3,700	3,900	4,100	4,250

700 Angle

		DN	40	50	65	80	100	150	200	250	300	350	400	450
	ISO PN 10; 16	L (mm)	124	124	149	152	190	225	265	320	396	400	450	450
		W (mm)	155	155	178	200	222	320	390	480	550	550	740	740
		R (mm)	78	83	95	100	115	143	172	204	248	264	299	320
		h (mm)	85	85	109	102	127	152	203	219	273	279	369	370
		H (mm)	227	227	251	281	342	441	545	633	777	781	1,082	1,082
		Weight (Kg)	9.5	10	12	21.5	35	71	118	205	350	370	800	820
	ISO PN 10; 16	L (mm)	124	124	149	159	200	234	277	336	415	419	467	467
		W (mm)	165	165	185	207	250	320	390	480	550	550	740	740
		R (mm)	78	85	95	105	127	159	191	223	261	293	325	358
		h (mm)	85	85	109	109	135	165	216	236	294	299	386	386
		H (mm)	227	227	251	287	350	454	558	649	796	801	1,099	1,099
		Weight (Kg)	11	11.5	13.5	23	41	81	138	233	390	425	855	870

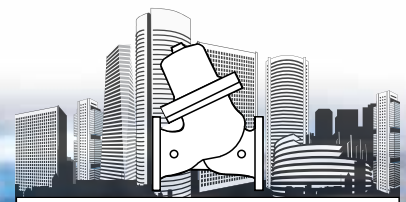
Threaded

700 Angle

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

700 Y Pattern

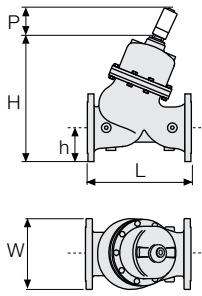
		DN	40	50	65	80
	BSP; NPT	L (mm)	155	155	212	250
		W (mm)	122	122	122	163
		h (mm)	40	40	48	56
		H (mm)	201	202	209	264
		Weight (Kg)	5.5	5.5	8	17



SI

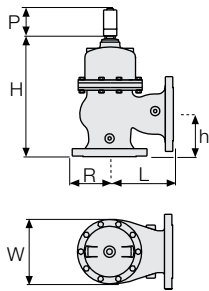
800 Metric

800 "Y" Pattern



	DN	40	50	65	80	100	150	200	250	300	350	400	450	500
ISO PN 10; 16	L (mm)	205	210	222	250	320	415	500	605	725	733	990	1,000	1,100
	W (mm)	156	166	190	200	229	286	344	408	484	536	600	638	716
	h (mm)	78	83	95	100	115	143	172	204	242	268	300	319	358
	H (mm)	260	265	278	327	409	526	650	763	942	969	1,154	1,173	1,211
	P* (mm)	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	1,000	1,074	1,096
ISO PN 25; 40	L (mm)	205	210	222	264	335	433	524	637	762	767	1,024	1,030	1,136
	W (mm)	156	166	190	210	254	318	382	446	522	590	650	714	778
	h (mm)	78	83	95	105	127	159	191	223	261	295	325	357	389
	H (mm)	260	265	278	332	422	542	666	783	961	996	1,179	1,208	1,241
	P* (mm)	N/A	N/A	N/A	N/A	N/A	135	135	142	154	154	191	191	191
	Weight (Kg)	11.8	15	18.4	32	56	106	190	307	505	549	1,070	1,095	1,129

800 Angle



	DN	40	50	65	80	100	150	200	250	300	350	400	450
ISO PN 10; 16	L (mm)	124	124	149	152	190	225	265	320	396	400	450	450
	W (mm)	156	166	190	200	229	285	344	408	496	528	598	640
	R (mm)	78	83	95	100	115	143	172	204	248	264	299	320
	h (mm)	85	85	109	102	127	152	203	219	273	279	369	370
	H (mm)	252	252	271	308	390	476	619	717	911	915	1,144	1,144
	P* (mm)	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	1,020	
ISO PN 25; 40	L (mm)	124	124	149	159	200	234	277	336	415	419	467	467
	W (mm)	150	155	190	200	254	318	381	446	522	586	650	716
	R (mm)	78	85	95	105	127	159	191	223	261	293	325	358
	h (mm)	85	85	109	109	135	165	216	236	294	299	386	386
	H (mm)	252	264	271	315	398	491	632	733	930	935	1,160	1,160
	P* (mm)	N/A	N/A	N/A	N/A	N/A	141	141	156	156	156	195	195
Weight (Kg)	11.8	15	18.4	30	54	101	179	292	481	523	1,017	1,051	

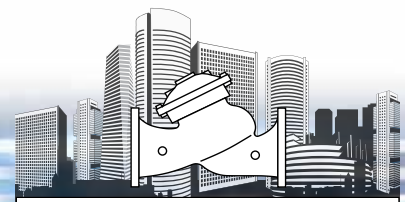
*P – Height of optional auxiliary closing piston or shaft balancing assembly

SI

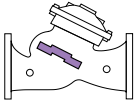
700 & 800 Metric

Control Chamber Displacement Volume (liter)

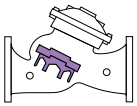
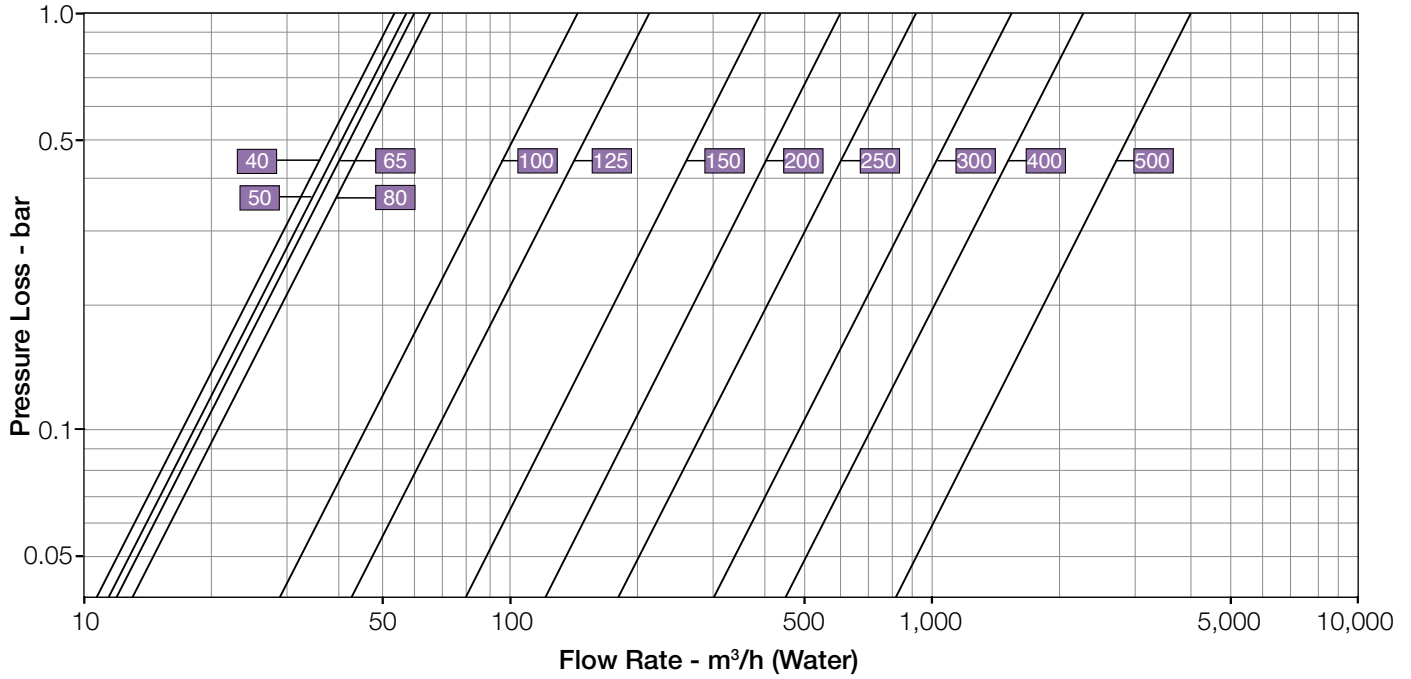
DN	40	50	65	80	100	150	200	250	300	350	400	450	500	600-900
700-ES	0.125	0.125	0.125	0.125	0.3	0.5	2.15	4.5	8.5	N/A	12.4	N/A	29.8	N/A
700-EN	N/A	0.125	N/A	0.3	0.45	2.15	4.5	8.5	12.4	N/A	N/A	N/A	N/A	N/A
700	0.125	0.125	0.125	0.3	0.45	2.15	4.5	8.5	12.4	12.4	29.8	29.8	29.8	98
800	0.04	0.04	0.04	0.12	0.3	1.1	2.3	4	8	8	18.7	18.7	18.7	N/A



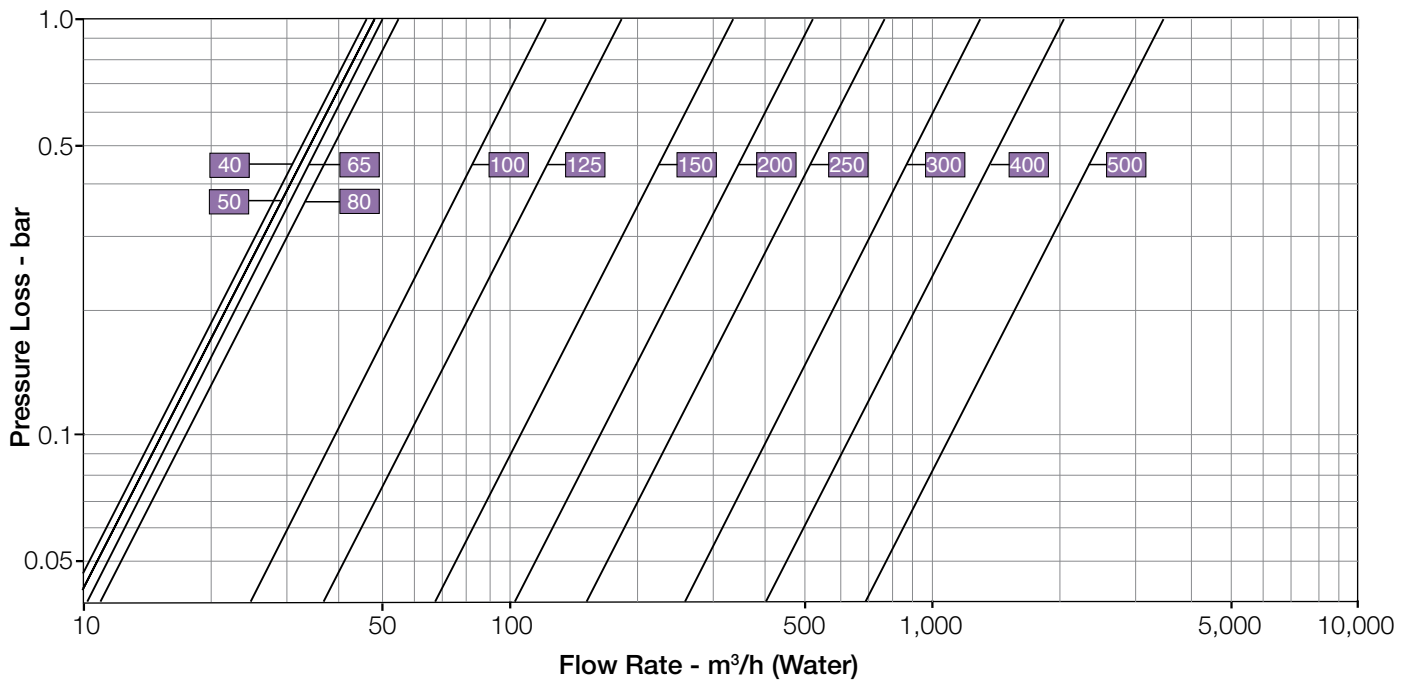
SI 700-ES Metric



"Y" Pattern, Flat Disc

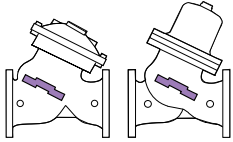


"Y" Pattern, Throttling Plug (V-Port)

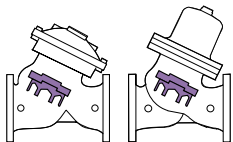
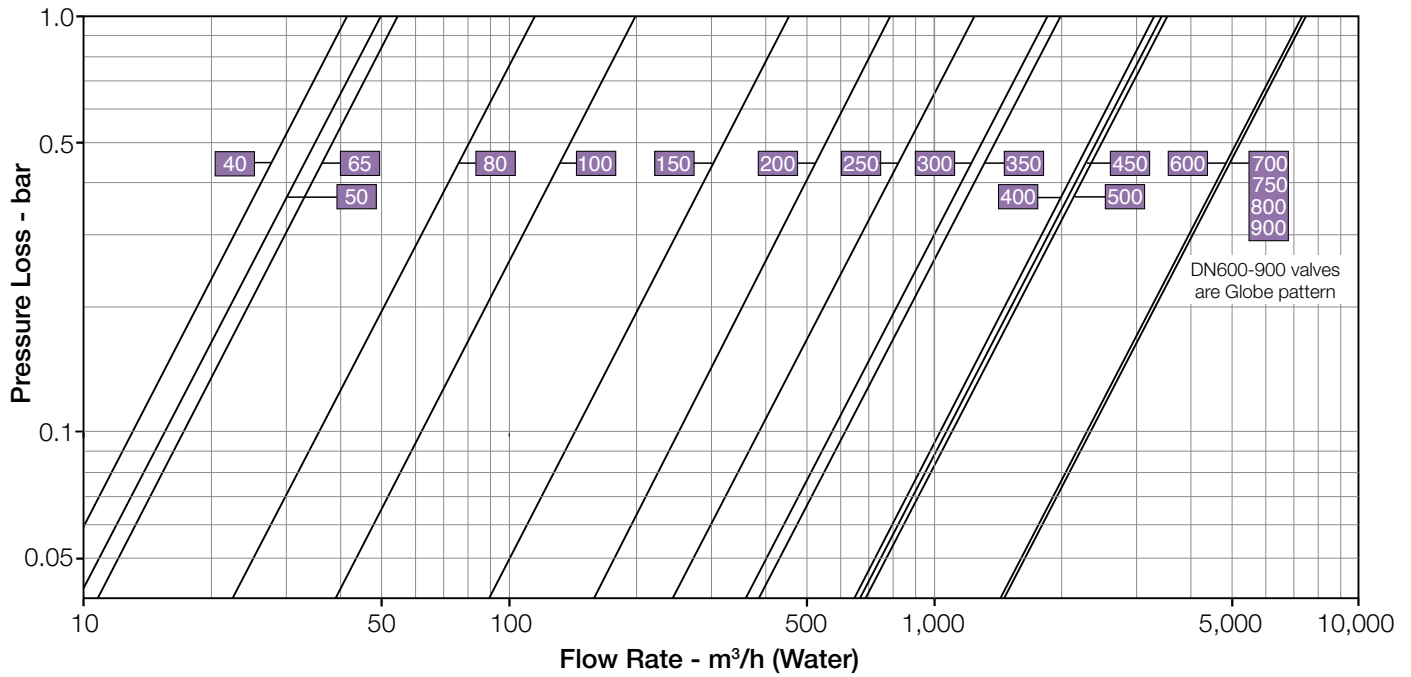




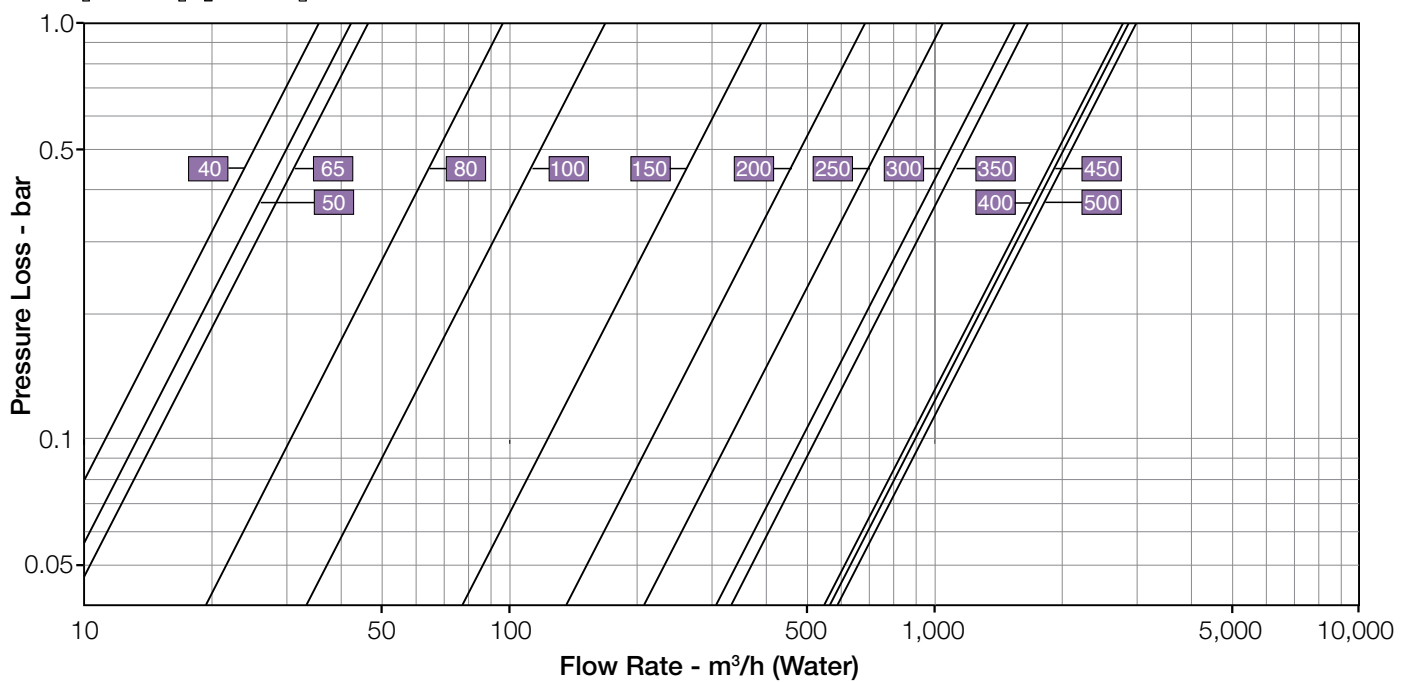
SI 700 & 800 Metric



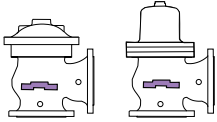
Y Pattern, Flat Disc



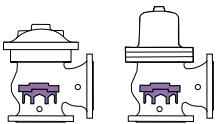
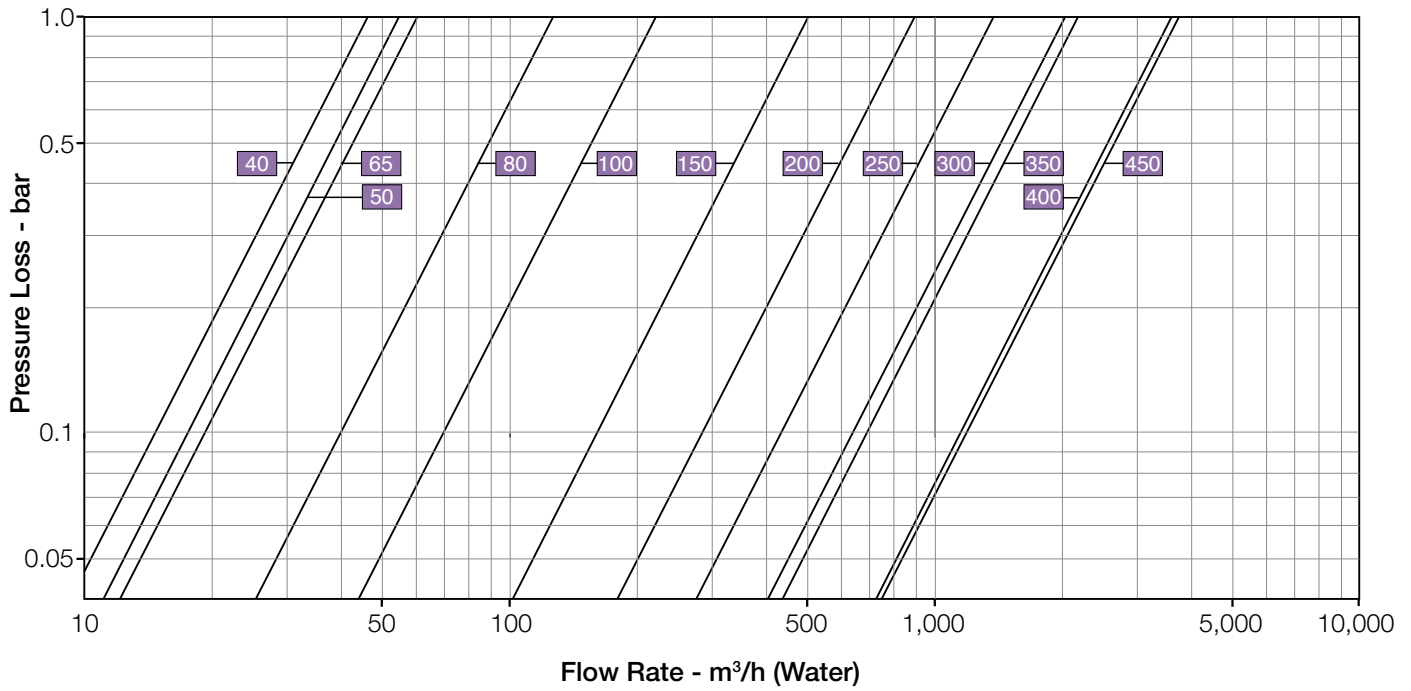
Y Pattern, Throttling Plug (V-Port)



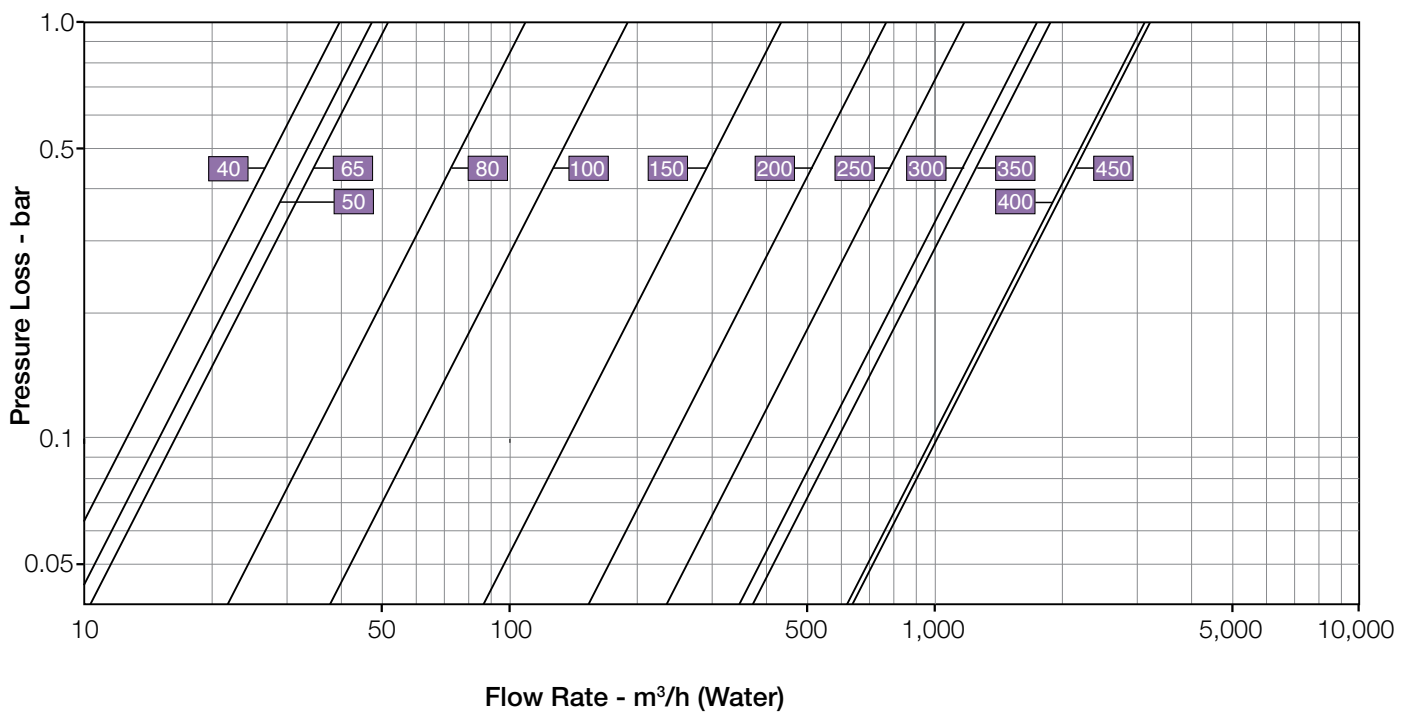
SI 700 & 800 Metric



Angle Pattern, Flat Disc





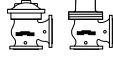
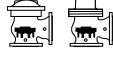



Angle Pattern, Throttling Plug (V-Port)





SI 700 & 800 Metric

	DN	40	50	65	80	100	125	150	200	250	300	350	400	450	500
700 / 800 Y-Pattern Flat Disc 	Kv	42	50	55	115	200	N/A	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	N/A	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	N/A	37.5	53.9	70	85.6	159.9	112.7	204.8	323.8
700 / 800 Y-Pattern V-Port 	Kv	36	43	47	98	170	N/A	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	N/A	5.2	5.2	5.4	5.1	8.2	5.1	7.6	10.8
	Leq - m	6	14.3	46.2	29.9	31.9	N/A	51.9	74.6	96.8	118.4	221.3	155.9	283.5	448.1
700-ES Y-Pattern Flat Disc 	Kv	54	57	60	65	145	215	395	610	905	1,520	N/A	2,250	N/A	4,070
	K	1.4	3.0	7.8	15.2	7.5	8.3	5.1	6.7	7.5	5.5	N/A	7.9	N/A	5.9
	Leq - m	2.8	7.5	25.3	60.8	37.3	51.7	38.1	96.3	138.4	126.8	N/A	253.6	N/A	246.3
700-ES Y-Pattern V-Port 	Kv	46	48	51	55	123	183	336	519	769	1,292	N/A	2,027	N/A	3,460
	K	1.9	4.3	10.8	21.2	10.4	11.4	7.0	9.3	10.4	7.6	N/A	9.8	N/A	8.2
	Leq - m	3.8	10.6	34.9	84.9	51.8	71.4	52.7	133.0	191.7	175.5	N/A	312.4	N/A	340.8
700 / 800 Angle Flat Disc 	Kv	46	55	61	127	220	N/A	506	897	1,375	2,035	2,189	3,641	3,773	N/A
	K	1.9	3.2	7.6	4	3.2	N/A	3.1	3.1	3.2	3.1	4.9	3	4.5	N/A
	Leq - m	3.6	8.5	27.6	17.8	19	N/A	31	44.6	57.8	70.7	132.1	93.1	169.3	N/A
700 / 800 Angle V-Port 	Kv	39	47	51	108	187	N/A	430	762	1,169	1,730	1,861	3,095	3,207	N/A
	K	2.6	4.5	10.6	5.6	4.5	N/A	4.3	4.3	4.5	4.2	6.8	4.2	6.2	N/A
	Leq - m	5	11.8	38.2	24.7	26.4	N/A	42.9	61.7	80	97.9	182.9	128.9	234.3	NA
700-M6 G-Pattern Flat Disc 	DN	600	700	750	800	900									
	Kv	7,350	7,500	7,500	7,500	7,500									
	K	3.8	6.7	8.8	11.4	17.1									
	Leq - m	188	390.1	550.9	760.7	1,261									

Differential Pressure Calculation

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 1psi Diff. Press.)

$$(Cv = 1.155 Kv)$$

Q = Flow rate (m³/h; gpm)

ΔP = Differential pressure (bar; psi)

Gf = Liquid specific gravity (Water = 1.0)

Practical formulas for water: $Q = Kv \sqrt{\Delta P}$ $\Delta P = \left(\frac{Q}{Kv}\right)^2$

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

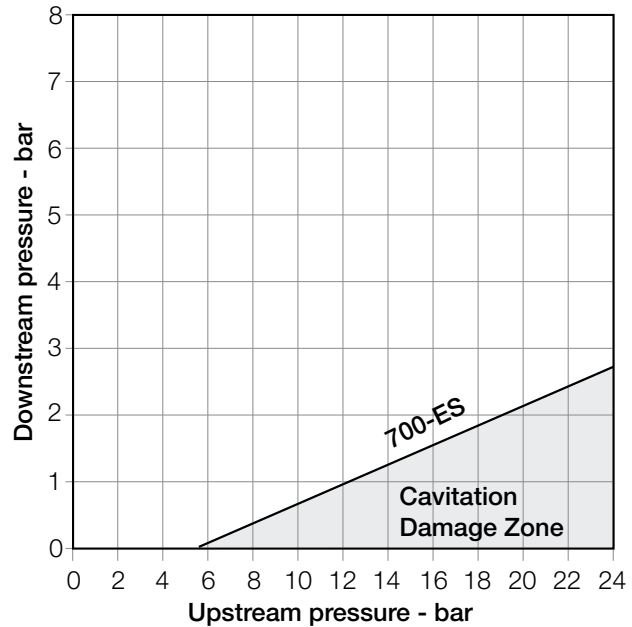
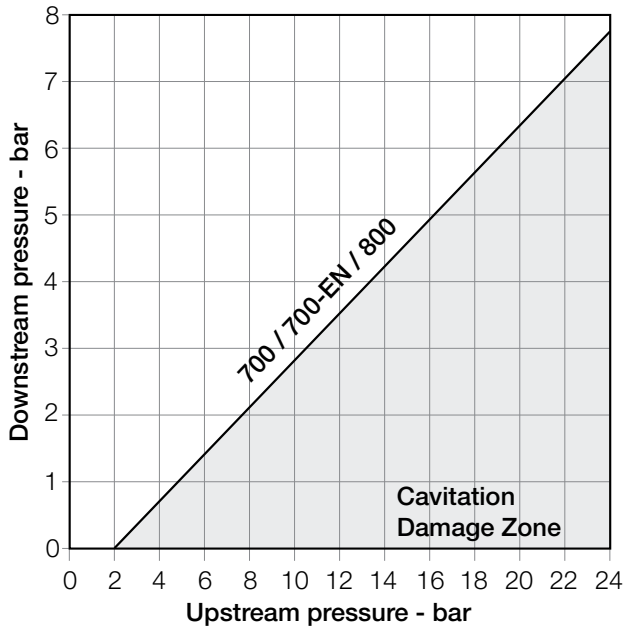
Note:

The Leq values given are for general consideration only.

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



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:

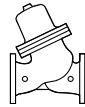
- A) Reduce system pressure in stages designing each pressure stage to be above cavitation conditions.
- B) Consider using other valve selection criteria
 - a. Valve body and plug type
 - b. Valve size
 - c. Valve material

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.

**US**

700 English

**US**

800 English

Series Patterns and Sizes

- 700 Series – Y Pattern – 1½"-20"
- 700 Series – Angle – 1½"-18"
- 700-M6 Series – Globe – 24"-36"

Connection Standard

- Flanged: ANSI B16.42 (Ductile Iron)
- Threaded: NPT or BSP (1½" -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

Series Patterns and Sizes

- 800 Series – Y Pattern – 1½"-20"
- 800 Series – Angle – 1½"-18"

Connection Standard

- Flanged: ANSI B16.5 (Cast steel)

Water Temperature

- Up to 180°F

Working pressure

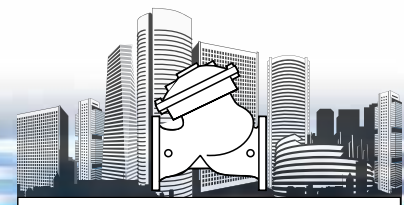
- Class #150: 250 psi
- Class #300: 400 psi
- Class #400: 600 psi

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

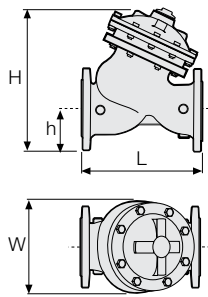
- **Main valve body and Cover**
Ductile Iron to ASTM A-536
Stainless Steel 316 to ASTM A-743 CF8M
Nickel Aluminum Bronze to ASTM B-148 C 95800
Other materials on request
- **Control Trim**
Stainless Steel 316, Nickel Aluminum Bronze
Hastalloy C-276 accessories
Monel fittings & tubing
- **Elastomers**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



US 700 English

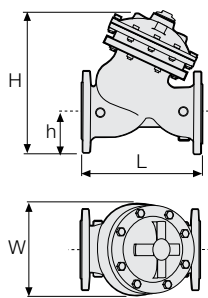
Flanged

Y Pattern



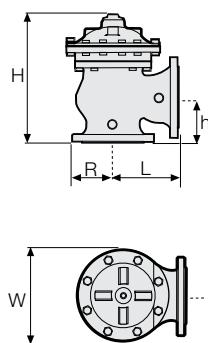
	inch	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
ANSI 150	L	8.1	8.3	8.7	9.8	12.6	16.3	19.7	23.8	28.5	28.9	39	39.4	43.3
	W	6.1	6.5	7	7.9	8.8	12.6	15.4	18.9	21.7	21.7	29.1	29.1	29.1
	h	3.1	3.3	3.7	3.9	4.5	5.6	6.8	8	9.5	10.6	11.8	12.6	14.1
	H	9.4	9.6	10.1	12	14.4	19.4	23	28.5	33.1	34.1	43.6	44.4	45.9
	Weight (lb)	20	23	29	49	82	165	276	478	816	840	1,865	2,083	2,121
ANSI 300	L	8.1	8.3	8.7	10.4	13.2	17	20.6	25.1	30	30.2	40.3	40.6	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	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	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	1,984	2,132	2,174

Globe Pattern



	inch	24"	28"	30"	32"	36"
ANSI 150	L	57	65	70	73	73
	W	49	49	49	49	49
	h	18.5	19	20.5	21.8	23.6
	H	77	78	79.3	80.6	82.5
	Weight (lb)	7,150	8,140	8,580	9,020	9,350
ANSI 300	L	59	65	70	73	73
	W	49	49	49	49	49
	h	18.5	19	20.5	21.8	23.6
	H	77	78	79.3	80.6	82.5
	Weight (lb)	7,700	8,140	8,580	9,020	9,370

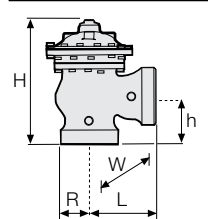
Angle Pattern



	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	7.5	8.9	10.4	12.6	15.6	15.7	17.7	17.7
	W	6.1	6.1	7	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	9.8	10.4	11.8	12.6
	h	3.3	3.3	4.3	4	5	6	8	8.6	10.7	11	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
Weight (lb)	21	22	27	47	77	157	260	452	772	816	1,764	1,808	
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	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	17.9	304	514	860	937	1,885	1,918	

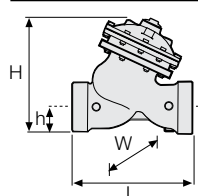
Threaded

Angle Pattern

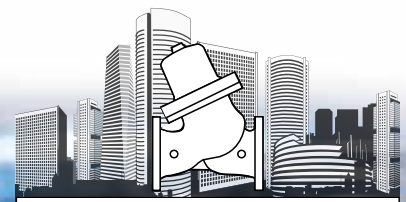


	inch	2"	2 1/2"	3"
BSP; NPT	L	4.8	5.5	6.3
	W	4.8	4.8	6.4
	R	1.6	1.9	2.2
	h	3.3	4	4.5
	H	8.9	9.5	11.6
Weight (lb)	12	15	33	

Y Pattern

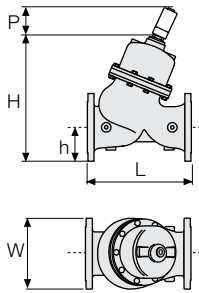


	inch	1 1/2"	2"	2 1/2"	3"
BSP; NPT	L	6.1	6.1	8.3	9.8
	W	4.8	4.8	4.8	6.4
	h	1.6	1.6	1.9	2.2
	H	7.9	8	8.2	10.4
	Weight (lb)	12	12	18	37



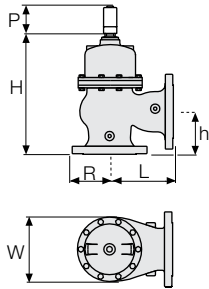
US 800 English

"Y" Pattern



	inch	1½"	2"	2½"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
ANSI 150	L	8.1	8.3	8.7	9.8	12.6	16.3	19.7	23.8	28.5	28.9	39	39.4	43.3
	W	6.1	6.5	7.5	7.9	9.0	11.3	13.5	16.1	19.1	21.1	23.6	25.1	28.2
	h	3.1	3.3	3.7	3.9	4.5	5.6	6.8	8	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	1,001	1,060	2,200	2,363	2,411	
ANSI 300; 400	L	8.1	8.3	8.7	10.4	13.2	17	20.6	25.1	30	30.2	40.3	40.6	44.7
	W	6.1	6.5	7.5	8.3	10.0	12.5	15.0	17.6	20.6	23.2	25.6	28.1	30.6
	h	3.1	3.3	3.7	4.1	5	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	1,111	1,208	2,354	2,409	2,484	

Angle Pattern



	inch	1½"	2"	2½"	3"	4"	6"	8"	10"	12"	14"	16"	18"
ANSI 150	L	4.9	4.9	5.9	6	7.5	8.9	10.4	12.6	15.6	15.7	17.7	17.7
	W	6.1	6.5	7.5	7.9	9.0	11.2	13.5	16.1	19.5	20.8	23.5	25.2
	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	14.5	14.6
	H	9.9	9.9	10.7	12.1	15.4	18.7	24.4	28.2	35.9	36	45	45
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	1,010	2,090	2,244	
ANSI 300; 400	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	5.9	6.1	7.5	7.9	10.0	12.5	15.0	17.6	20.6	23.1	25.6	28.2
	R	3.1	3.3	3.7	4.1	5	6.3	7.5	8.8	10.3	11.5	12.8	14.1
	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	5.6	6.1	6.1	6.1	7.7	7.7	
Weight (lb)	26	33	40	66	119	222	394	642	1,058	1,151	2,237	2,312	

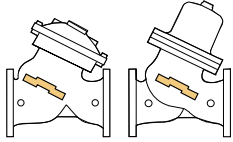
*P – Height of optional auxiliary closing piston or shaft balancing assembly

US 700&800 English

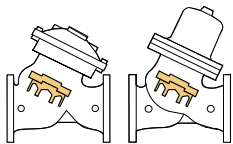
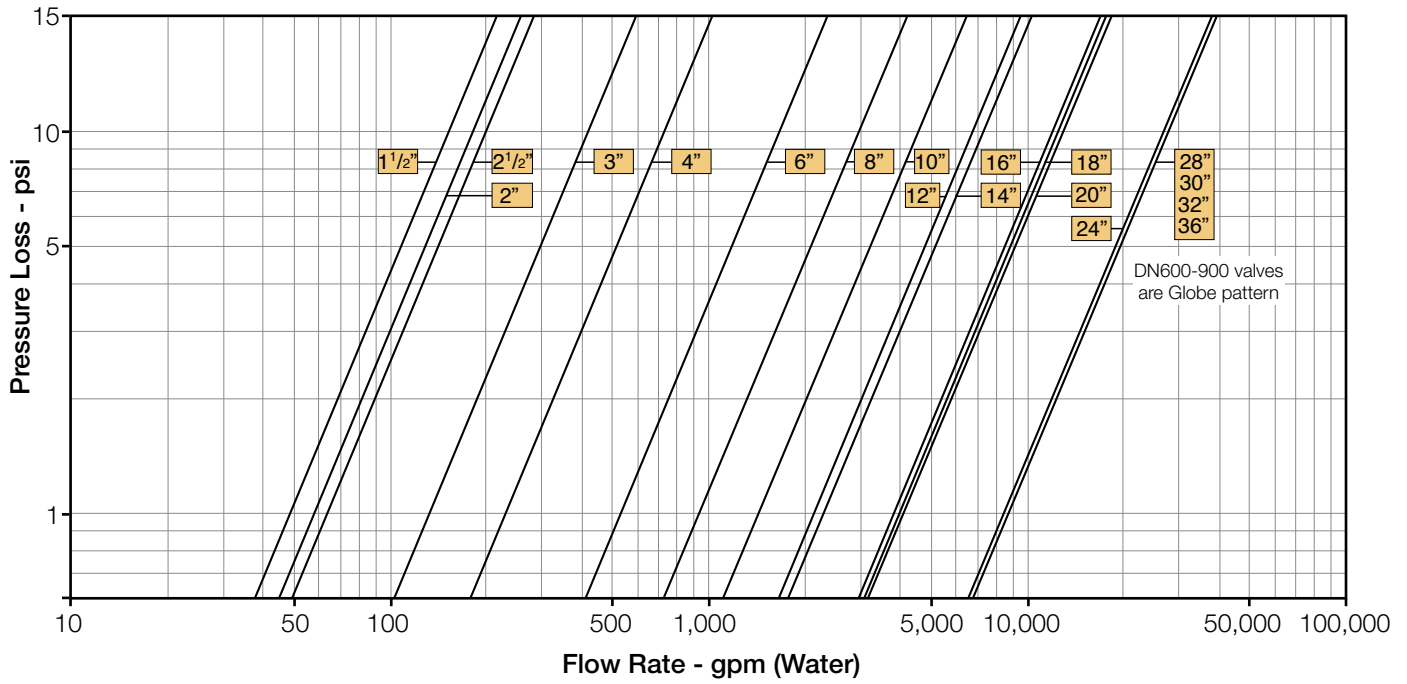
Control Chamber Displacement Volume (gallon)

Sizes	1½"-2½"	3"	4"	6"	8"	10"	12"-14"	16"-20"	24"-36"
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	-

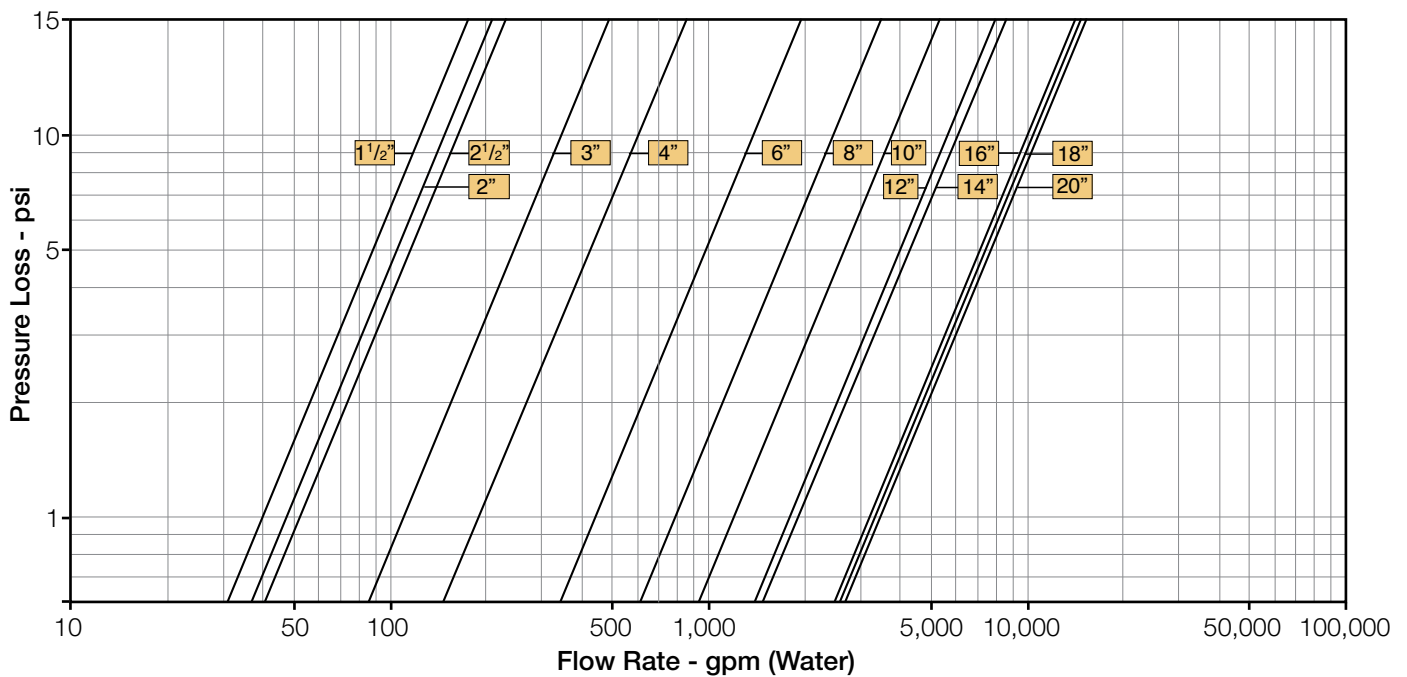
US 700 & 800 English



Y Pattern, Flat Disc

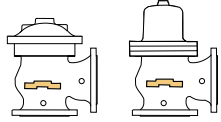


Y Pattern, Throttling Plug (V-Port)

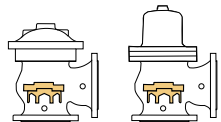
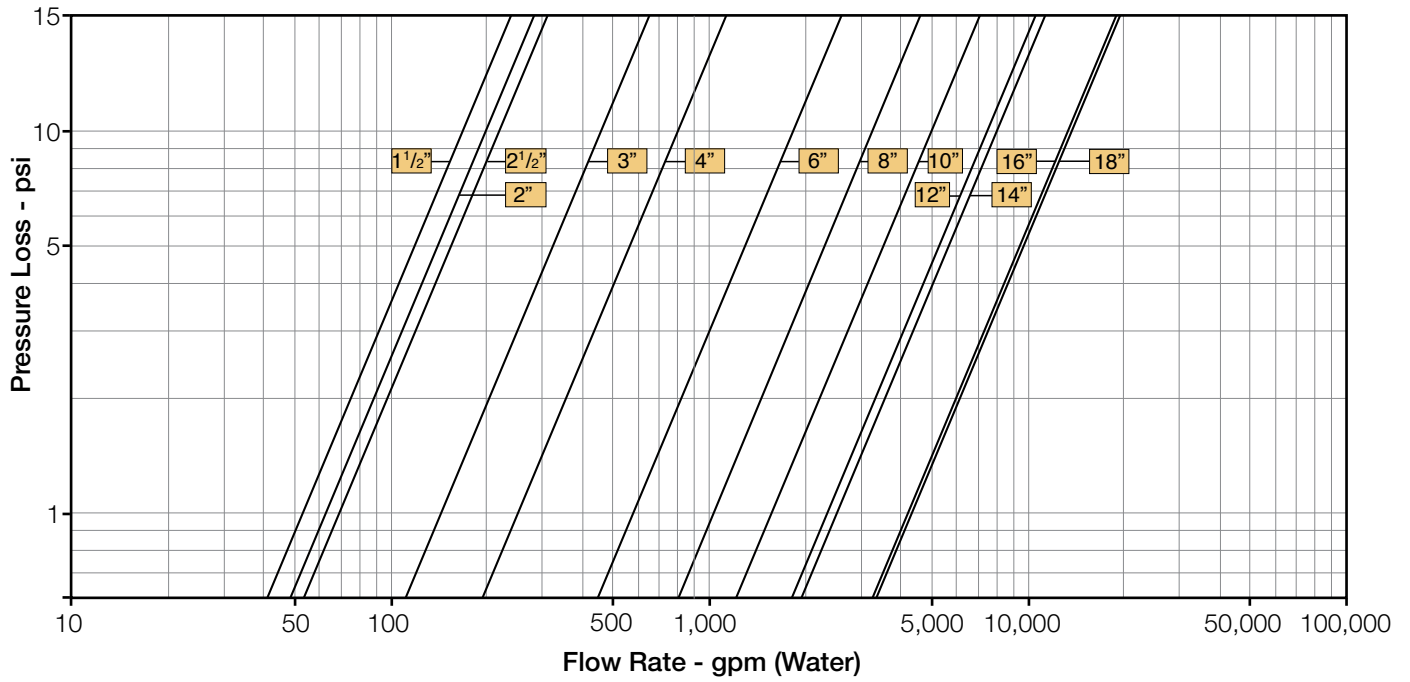




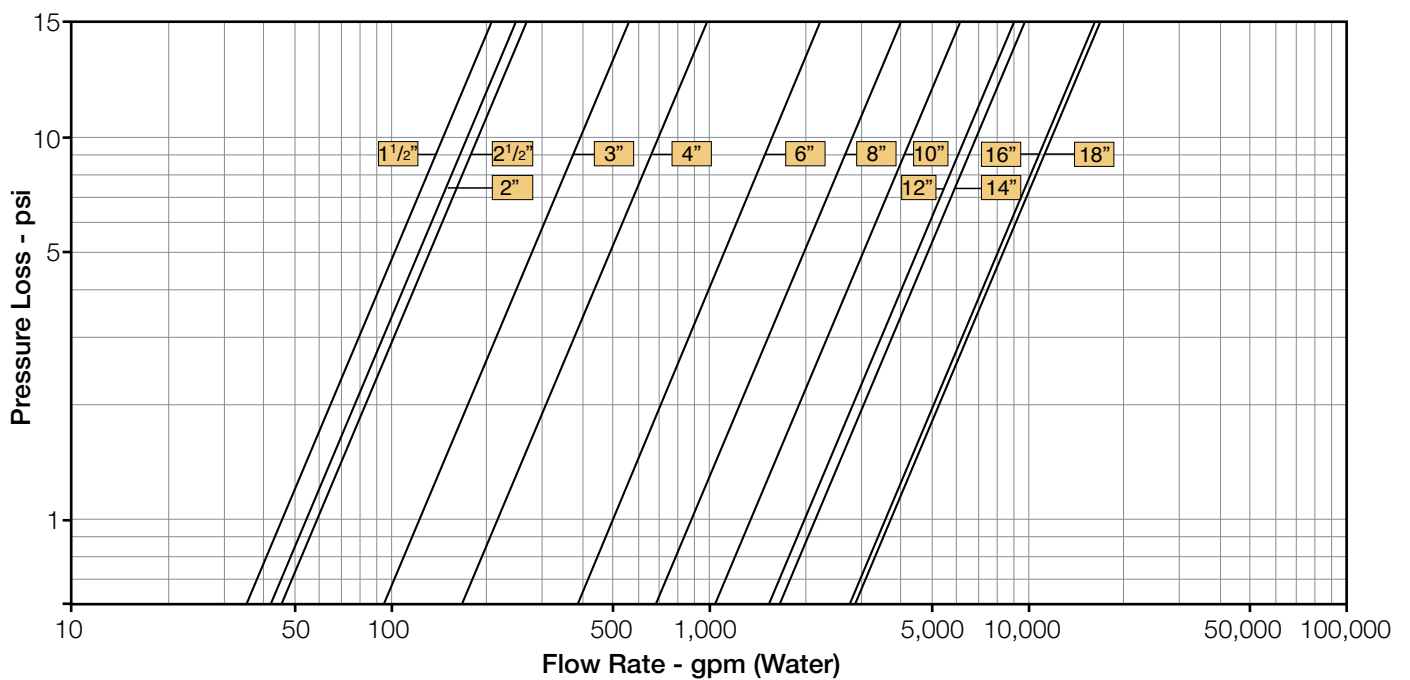
US 700 & 800 English



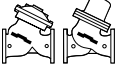

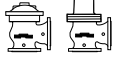
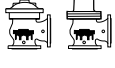
Angle Pattern, Flat Disc




Angle Pattern, Throttling Plug (V-Port)



US 700 & 800 English

	inch	1.5"	2"	2.5"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
Y-Pattern Flat Disc 	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 V-Port 	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 Disc 	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 V-Port 	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

	inch	24"	28"	30"	32"	36"
G-Pattern Flat Disc 	Cv	8,490	8,670	8,670	8,670	8,670
	K	3.8	6.7	8.8	11.4	17.1
	Leq-feet	616.6	1,280.0	1,807.3	2,495.6	4,136.5

Differential Pressure Calculation

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 1psi Diff. Press.)

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

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

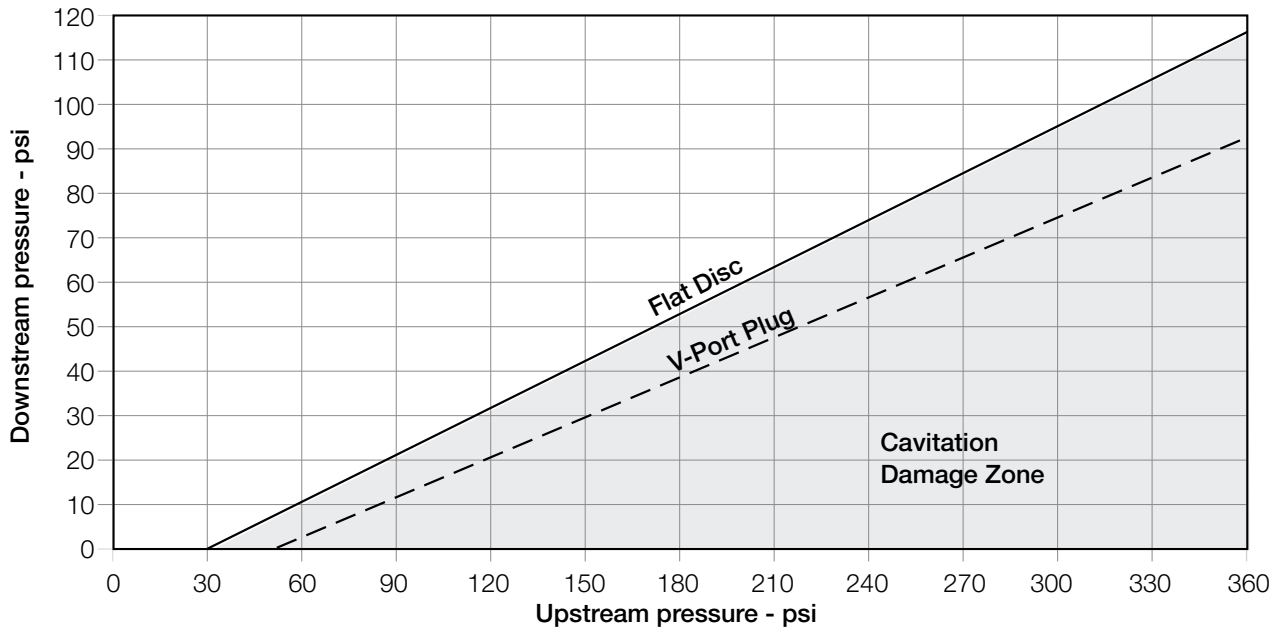
In order to simplify system head loss calculation, add the Leq value to the pipe length of the relevant size

Note:

The Leq values given are for general consideration only.

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

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 Guide for Bermad 700 Series valves are based on the formula commonly used in the valve industry:

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

Where:

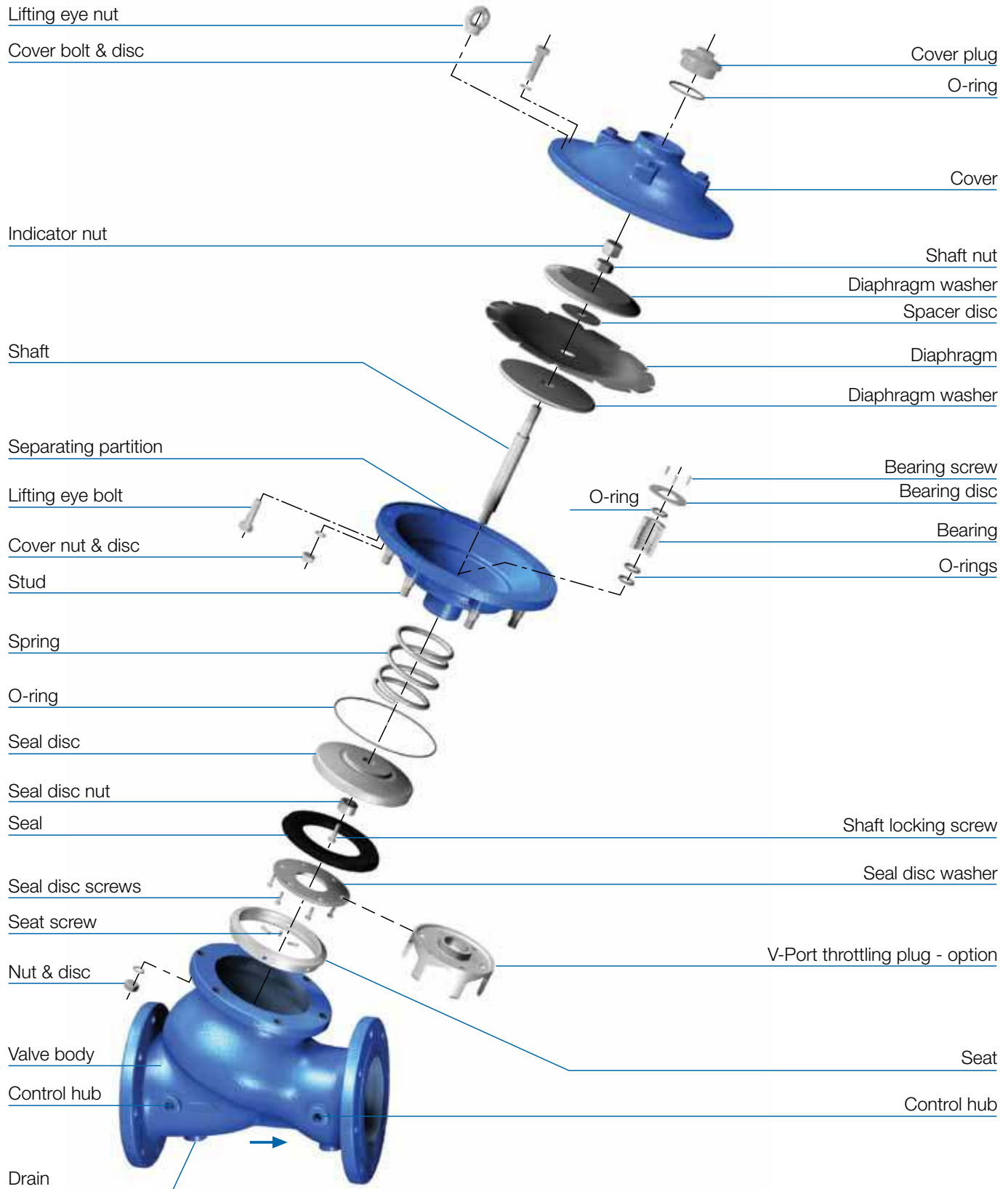
- σ = Sigma, cavitation index, dimensionless
- P1 = Upstream pressure, absolute
- P2 = Downstream pressure, absolute
- Pv = Liquid vapor pressure, absolute
(Water, 18°C = 0.02 bar-a; 65°F = 0.3 psi-a)

Use these guide 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:

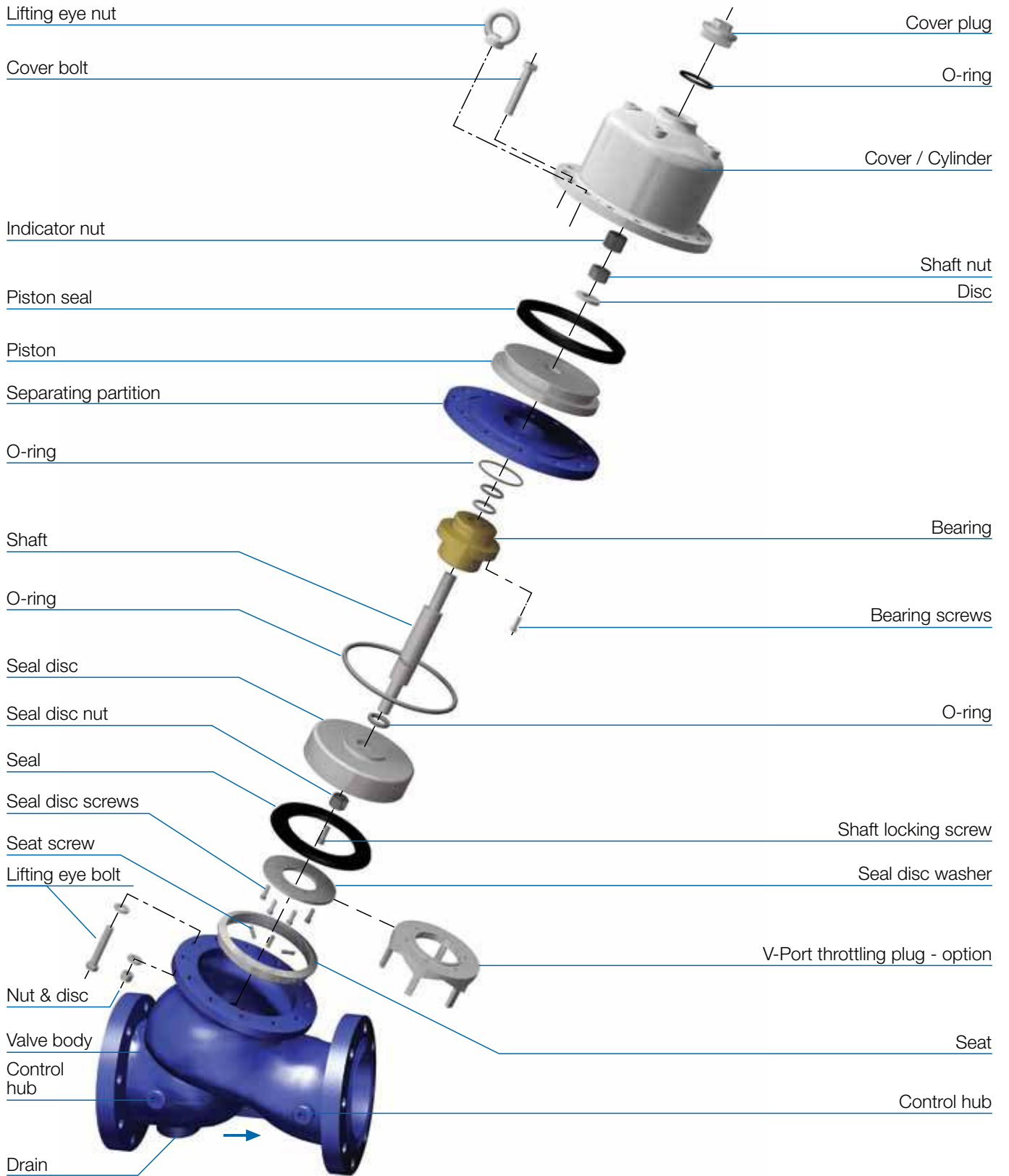
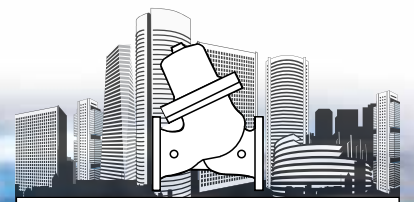
- A) Reduce system pressure in stages designing each pressure stage to be above cavitation conditions.
- B) Consider using other valve selection criteria
 - a. Valve body and plug type
 - b. Valve size
 - c. Valve material

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.



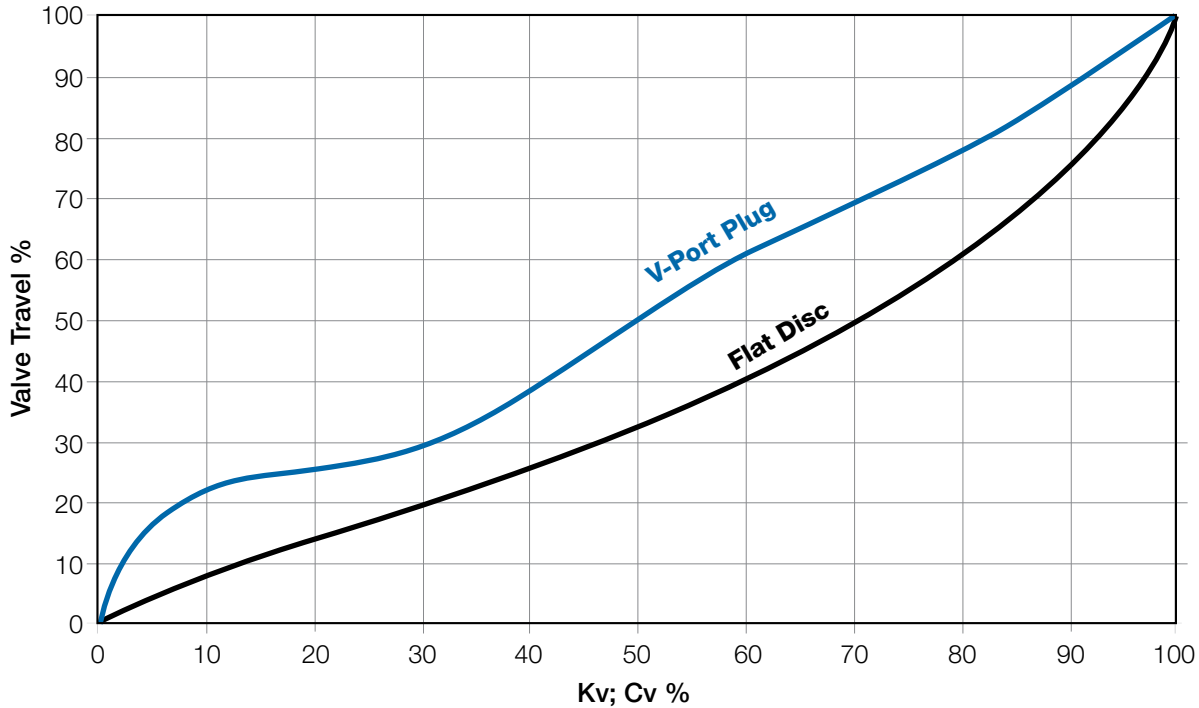
For spare parts ordering, please use BERMAD "Spare Parts Ordering Guide."



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Valve Plugs Characteristics

Kv; Cv to Valve Opening Chart



Typical Pressure Reducing Performance Chart

Actual Hydraulic Laboratory Results

