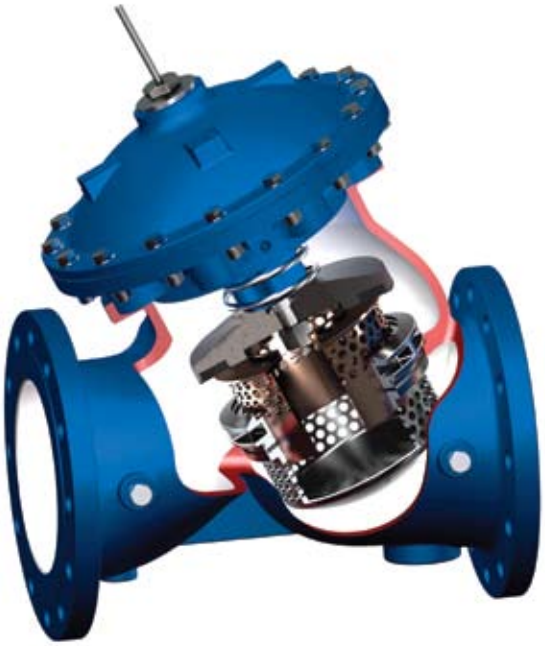
Anti-Cavitation Valve

Model 700-C2

- Eliminates cavitation damage
- High differential pressure operation
- Reduces noise and vibration
- Excellent control at near zero flow
- Drip tight sealing
- In-line serviceable

The Bermad Model 700-C2 Anti-Cavitation Control Valve is designed to operate under high differential pressure conditions without suffering cavitation damage



Typical Applications

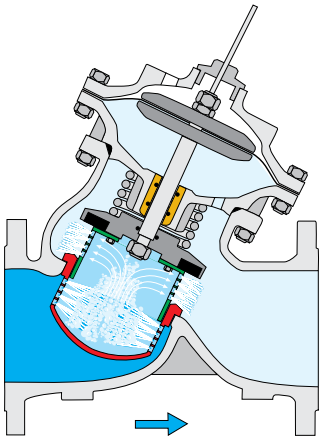
High differential pressure systems such as:

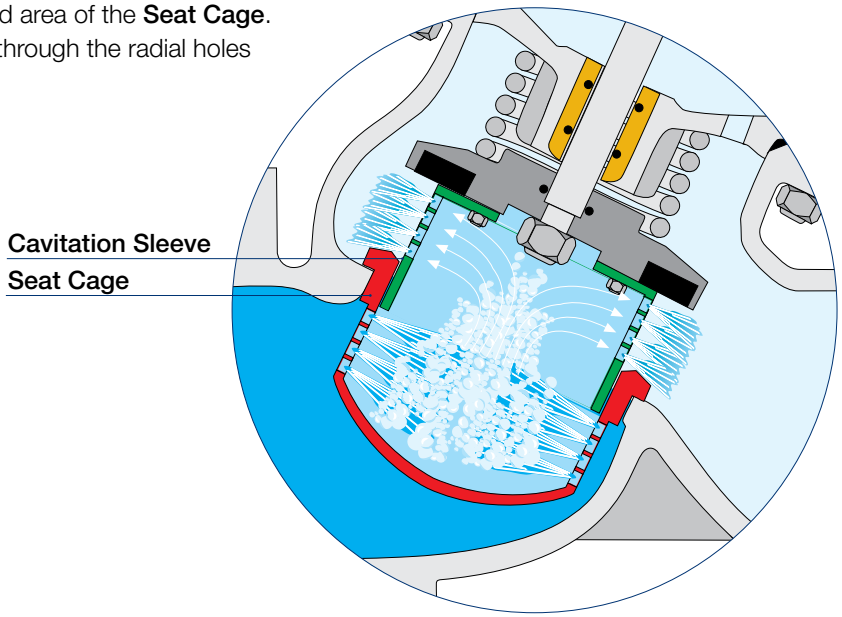
- Pressure Reduction
- Pressure Relief
- Level Control
- Flow Control

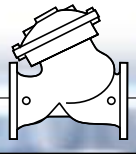
Operation

High pressure energy dissipates as flow passes through three stages:

- Stage 1: Entering the **Seat Cage** through a set of radial holes.
- Stage 2: Converging in the cavitation protected area of the **Seat Cage**.
- Stage 3: Exiting the cavitation protected area through the radial holes of the **Cavitation Sleeve**.







Technical Data

Patterns, End Connections & Sizes

"Y" Pattern: Flanged - 2"-24"; DN50-600
Grooved - 3"-8"; DN80-200,
Threaded - 1½"-3" ; DN40-80
Angle: Flanged - 2"-18" ; DN50-450,
Threaded - 2"-3" ; DN50-80

Standard Materials:

Main valve body and cover:
Ductile Iron, Carbon Steel, Stainless Steel
Seat Cage & Cavitation Sleeve:
Stainless Steel 304 or 316 (optional)
Main valve internal parts:
Stainless Steel, Bronze & Epoxy coated steel
Elastomers: Synthetic Rubber
Coating: Fusion Bonded Epoxy NSF-61 approved
Other materials are readily available
Water Temperature: Up to 80°C
Consult factory for higher temperature.

Pressure Ratings According to Body Materials

Body Material	Grade	End Connection Standard	Type	Max. Operating Pressure
Ductile Iron	ASTM A536 = EN 1563	Flanged ISO 7005-2	PN16	16 bar
			PN25	25 bar
		Grooved	PN25	25 bar
		Threaded ISO 7/1-RP (BSP)	PN25	25 bar
Cast Steel	ASTM A216-WCB = EN 10083-1	Flanged ISO 7005-2	PN16	16 bar
			PN25	25 bar
Stainless Steel 316	ASTM A351 CF8M = EN 10088-1	Flanged ISO 7005-2	PN16	16 bar
			PN25	25 bar

Other end connection standards available on request.

Flow Properties

Size	mm	40	50	65	80	100	150	200	250	300	350	400	450	500	600
	Inch	1½"	2"	2½"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
700-C2 Y-Pattern	Kv	16	20	21	43	75	170	300	410	742	744	1,237	1,282	1,327	1,597
	K	16	24	66	35	28	27	28	36	23	42	26	39	56	80
	Leq m	32	68	230	150	167	282	403	661	537	1,089	768	1,396	2,214	3,807
700-C2 Angle	Kv	17	22	23	47	83	187	330	451	816	818	1,361	1,410	N/A	N/A
	K	13	20	55	29	23	23	23	30	19	35	22	32	N/A	N/A
	Leq m	26	56	190	124	138	233	333	546	444	900	634	1,153	N/A	N/A

Differential Pressure Calculation

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

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:

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

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)
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.

Cavitation Charts

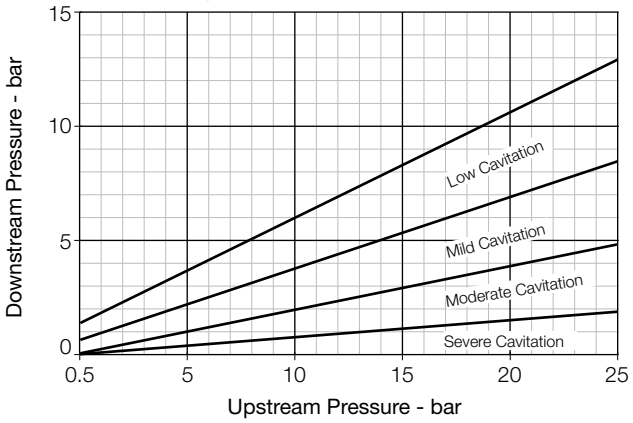
1. Calculate the flow velocity in m/sec according to the required flow and the estimated valve diameter. Use the formula:

$$V = 354 \times \frac{Q}{D^2}$$

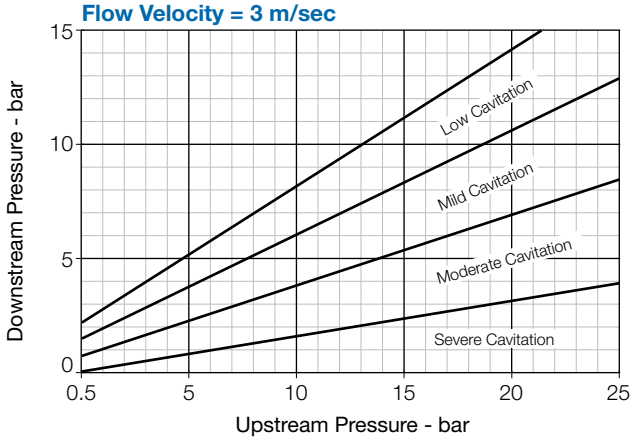
V = Flow velocity (m/sec)
Q = Flow (m^3/h)
D = Valve diameter (mm)

2. Select the relevant chart according to flow velocity
3. Locate cavitation status according to the relevant upstream and downstream pressure
4. In order to reduce cavitation damage:
   - Increase valve size
   - Consider multi stage system
   - Use higher grade materials - consult Bermad
5. The charts refer to 700-C2 series valves with double cavitation cages, Ductile Iron bodies and maximum water temperature at 18°C
6. For project specific cavitation data, please contact Bermad, with the design parameters of your application.

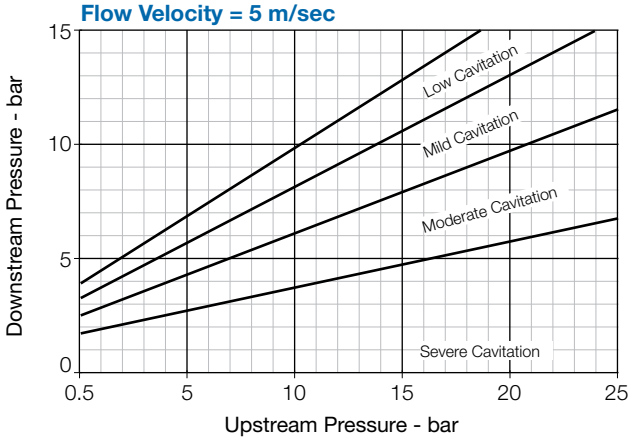
Flow Velocity = 1.5 m/sec



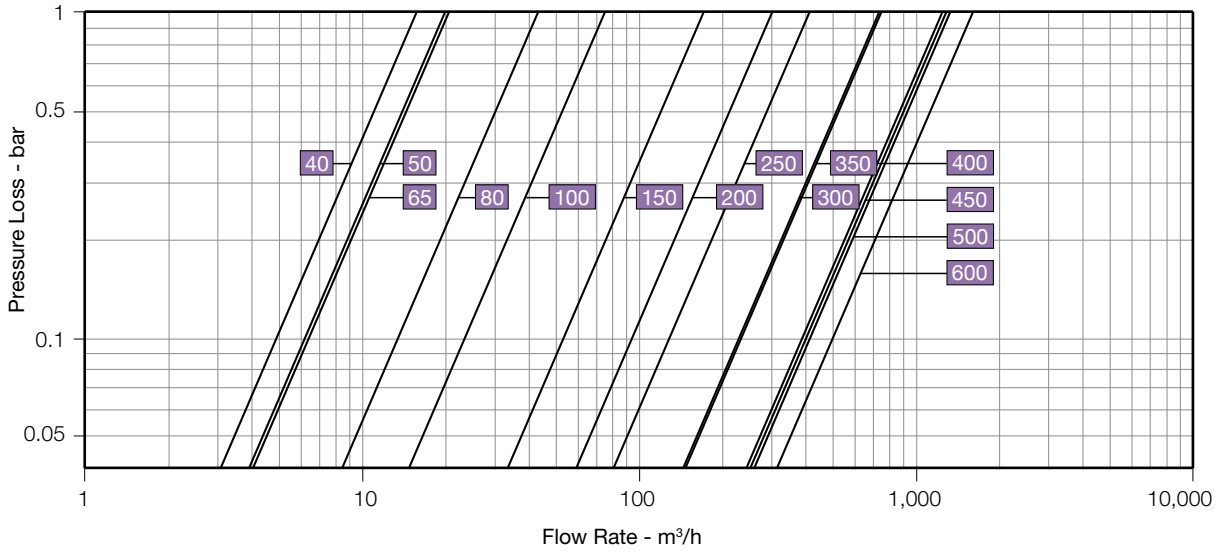
Flow Velocity = 3 m/sec



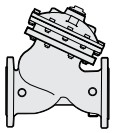
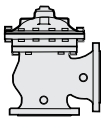
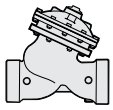
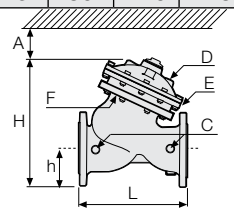
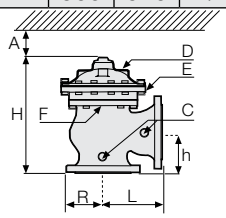
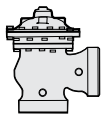
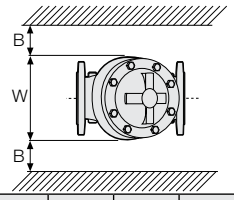
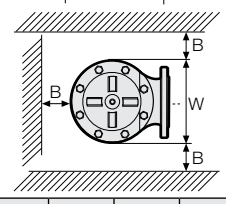
Flow Velocity = 5 m/sec



Flow Chart



Dimensions & Weights

		DN	40	50	65	80	100	150	200	250	300	350	400	450	500	600
		Inch	1½"	2"	2½"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
700-C2 "Y" Pattern 	ISO PN 10; 16	L (mm)	N/A	210	222	250	320	415	500	605	725	733	990	1,000	1,100	1,450
		W (mm)	N/A	165	178	200	223	320	390	480	550	550	740	740	740	845
		h (mm)	N/A	83	95	100	115	143	172	204	242	268	300	319	358	435
		H (mm)	N/A	244	257	305	366	492	584	724	840	866	1,108	1,127	1,167	1,235
		Weight (Kg)	N/A	11.1	13.5	23	39	79	133	232	392	403	896	995	1,012	1,123
	ISO PN 20; 25	L (mm)	N/A	210	222	264	335	433	524	637	762	767	1,024	1,030	1,136	N/A
		W (mm)	N/A	165	185	207	250	320	390	480	550	570	740	740	750	N/A
		h (mm)	N/A	83	95	105	127	159	191	223	261	295	325	357	389	N/A
		H (mm)	N/A	244	257	314	378	508	602	742	859	893	1,133	1,165	1,197	N/A
		Weight (Kg)	N/A	12.7	15.5	26	45	89	154	260	432	456	950	1,017	1,036	N/A
700-C2 Angle Pattern 	ISO PN 10; 16	L (mm)	N/A	124	149	152	190	225	265	320	396	400	450	450	N/A	N/A
		W (mm)	N/A	155	178	200	222	320	390	480	550	550	740	740	N/A	N/A
		R (mm)	N/A	83	95	100	115	143	172	204	248	264	299	320	N/A	N/A
		h (mm)	N/A	85	109	102	127	152	203	219	273	279	369	370	N/A	N/A
		H (mm)	N/A	227	251	281	342	441	545	633	777	781	1,082	1,082	N/A	N/A
		Weight (Kg)	N/A	10.5	12.5	22.5	37	75	126	220	372	392	850	870	N/A	N/A
	ISO PN 20; 25	L (mm)	N/A	124	149	159	200	234	277	336	415	419	467	467	N/A	N/A
		W (mm)	N/A	165	185	207	250	320	390	480	550	550	740	740	N/A	N/A
		R (mm)	N/A	85	95	105	127	159	191	223	261	293	325	358	N/A	N/A
		h (mm)	N/A	85	109	109	135	165	216	236	294	299	386	386	N/A	N/A
		H (mm)	N/A	227	251	287	350	454	558	649	796	801	1,099	1,099	N/A	N/A
		Weight (Kg)	N/A	12	14	24	43	85	146	248	412	447	905	920	N/A	N/A
700-C2 "Y" Pattern 	BSP	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)	6	6	8.5	18										
700-C2 Angle Pattern 	BSP	L (mm)	N/A	121	140	159										
		W (mm)	N/A	122	122	163										
		R (mm)	N/A	40	48	55										
		h (mm)	N/A	83	102	115										
		H (mm)	N/A	225	242	294										
		Weight (Kg)	N/A	6	7.5	16										
Pilot system and minimum service distance		A (mm)	200	200	200	250	320	420	530	620	790	790	1000	1000	1000	1000
		B (mm)	350	350	350	370	400	430	480	520	550	550	650	650	650	650
Body ports		C	1/4" NPT			3/8" NPT				1/2" NPT			1" BSPT			
Cover ports		D (NPT)	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/2"	1/2"	1/2"	3/4"	3/4"	3/4"	3/4"
Lower chamber ports		E (NPT)	1/8"	1/8"	1/8"	1/8"	1/8"	1/4"	1/4"	3/8"	3/8"	3/8"	3/4"	3/4"	3/4"	3/4"
Internal single chamber ports		F (NPT)	1/8"	1/8"	1/8"	1/8"	1/8"	1/4"	1/4"	3/8"	3/8"	3/8"	3/4"	3/4"	3/4"	3/4"
Control chamber displacement volume		(liter)	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	29.8
Stem travel		(mm)	15	15	15	21	26	35	45	53	72	72	100	100	100	100

Note: For grooved valves dimensions, refer to flanged valves dimensions