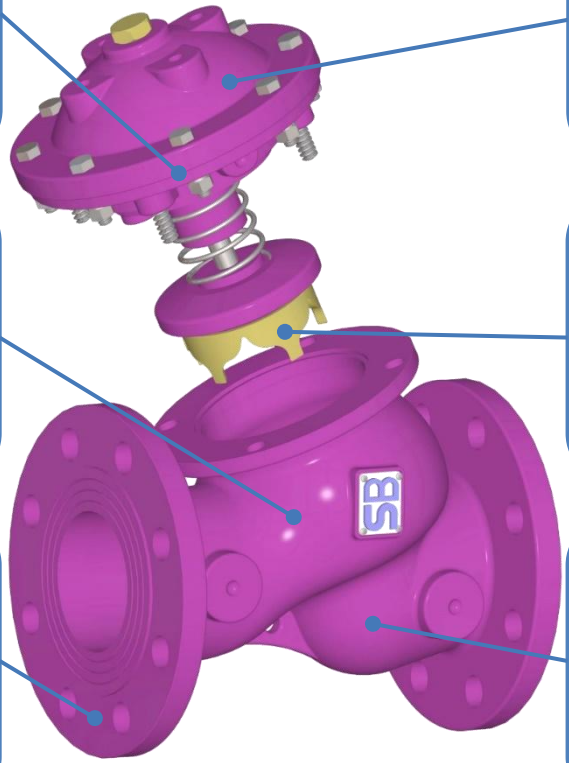
Water Control Valve - Basic Valve

Model: **41-00**

Easy of Maintenance
Single Air-Chamber Set can be dismantled from the valve. No need to dismantle the whole valve.

Excellent Control Performance
Diaphragm control makes the valve an excellent control performance. It can make the valve operation smooth, eliminate the shock, and avoid the damage caused by water hammer problems.



25% Direct Flow
Y-Shape body design makes the valve have excellent hydromechanics.

V-Port Plug
The optional V-Port Plug is more suitable for the small rate of flow, the environment of high pressure difference. It can effectively reduce the vibration and noise.

Antirust Painting
It makes the valve body a better antirust function, and extends the valve life.

Cv Value
Fluid passes through the lower part of the valve cover, so the resistance is less.
Cv Value is larger than that of the Ball-Type Control Valve.

Features

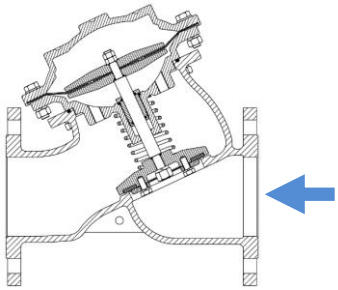
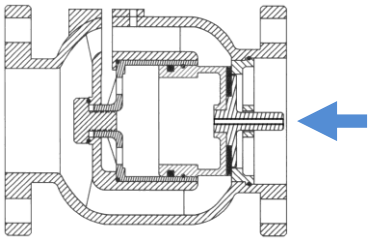
- **Reliable sealing function.**
- **No need to dismantle the whole valve from the pipeline for maintenance.**
- **Less resistance, fluid can pass through easily.**
- **Insensitive to foreign substances.**
- **Many kinds of connection specifications for choice.**
- **Strict tests for every valve in the factory.**

Water Control Valve-Basic Valve is controlled by the liquid pressure. It is a diaphragm control valve and mainly composed by two parts: Air-Chamber Set and Y-Shape Valve body. The Air-Chamber Set can be dismantled direct from the valve body during maintenance without dismantling the whole valve from the pipeline.

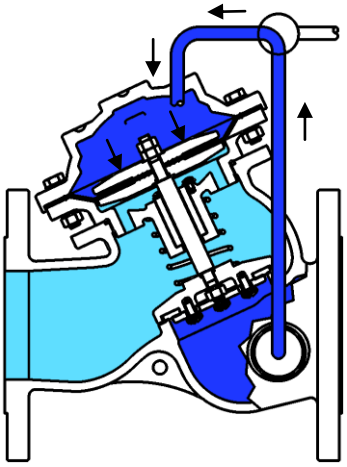
Y-Shape body design makes the valve have excellent hydromechanics. 25% Half-Direct Connection Design to reduce pressure loss. Besides, Fluid passes through the lower part of the valve cover, so the resistance of the fluid is less. Comparing with the same size of other control valves, Cv Value is larger.

41-00 Basic Valve is the foundation of all water control valves. It can join with different controllers to adapt different appliance situations, for example, Float Valve, Pressure Reducing Valve, Pressure Relief Valve, Pressure Sustaining Valve, Back Pressure Valve, Non-Slam Check Valve, Solenoid Control Valve, Rate of Flow Control Valve, Differential Pressure Relief Valve, etc. There are various kinds of valve sizes and connections for choice. The application situations are unlimited.

Comparisons of the advantages and disadvantages with other Valves

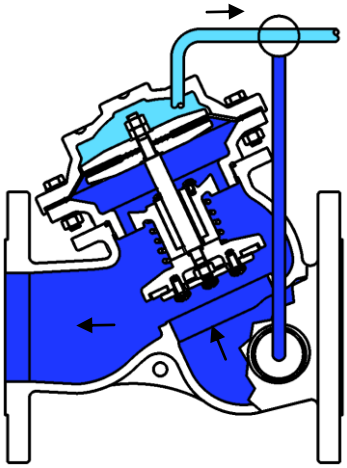
	Y-Shape diaphragm control valve	Other valves
Structure Drawing		
Rate of Flow	Hydraulic form, the rate of flow is larger than that of other control valves. The valve has 25% straight line flow area, which resistance is less and pressure loss is small, so it can save energy.	When fluid flows through the valve, it will cut the valve set and the inside structure. The resistance is extremely large and very easy to occur the corrosion phenomenon to shorten the lifetime of the valve.
Maintenance	It is easy to check and replace the pipelines as they are at the outside of the valve. Just dismantle the air chamber set for maintenance, no need to dismantle the whole valve.	No way to check and replace on the pipelines as part of them are inside the valve. Need to dismantle the whole valve for maintenance, which is very inconvenient.
Control	Open and Close are separately controlled and can be adjusted wantonly. The filter is built inside to avoid the blockage of foreign materials.	No way to adjust the speed of open and close. The close speed is too fast, so that it is easy to occur vibration and noise. The passageway to the air chamber is easy to be blocked by foreign materials.
Others	When the valve is fully opened, there is no any fittings to block from inlet to outlet. It is insensitive to foreign materials and substances. The V-Port Plug can be assembled. It is applied to small flow rate and high pressure difference environment. It is with air-out appliance which can manually remove air from the air chamber to guarantee the normal operation of the valve. Optional fittings are Travel Indicator, Check Valve, etc. There is a reserved nozzle on the valve for assembling pressure gage, thermometer or drain-pipe.	From inlet to outlet, there are valve set, valve enhanced tendon, etc. among the pipelines. They are sensitive to foreign materials and substances, especially to the banding substances, which are easy to get into the cylinder to damage the cylinder, piston and sealing, etc. The area ratio of the piston is too small, it possibly cannot close during low pressure. The air cannot be exhausted when the air is inside the air chamber which will affect the stability of the valve.

Operation Principle



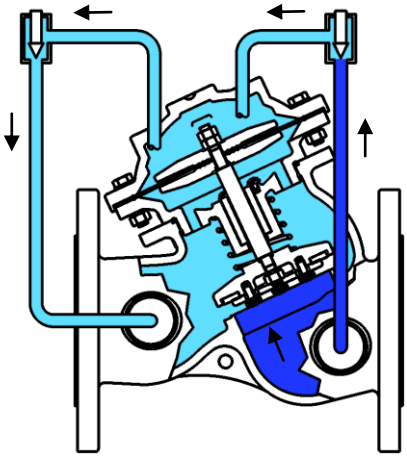
●Close

When the pressure gets into the air chamber from the inlet of the valve, the valve will form an airtight seal.



●Open

Once the fluid in the air chamber is discharged, there is no way to save the pressure in the air chamber. The valve will be opened and let the fluid pass through.



●Control

If the corresponding control appliance is assembled, the valve will automatically operate according to the pressure in the pipeline to guarantee the input/output pressure and rate of flow.

Materials

Valve Body：Ductile Iron / Stainless Steel
Inside parts：Stainless Steel
Diaphragm：NBR

Connection Way

DN50 Thread Connection
DN50~DN400 Flange connection

Working Temperature and Media

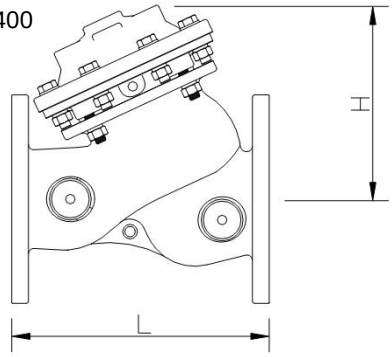
0℃~100℃，Water
※If it is used in other situation, please indicate it when ordering

Operating Pressure

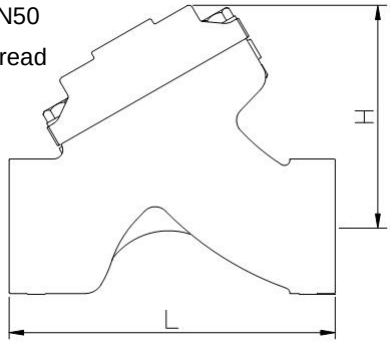
Flange Class	Max. Working Pressure	
	bar	psi
10K	14	205
16K	22	320
150LB	17.4	250
300LB	28	400
PN16	16	235
PN25	25	365

Dimension

DN50~DN400
Flange



DN50
Thread



Valve size	50 Tr	50	65	80	100	125	150	200	250	300	350	400
L(mm)	184	205	229	250	320	370	415	500	605	725	733	990
H(mm)	123	155	182	186	242	276	308	418	488	572	598	866
Weight(kg)	6	11	13	22	37	46	75	125	217	370	380	846

Notice：
※When installing the valve, strongly request to leave enough space for maintenance. It is necessary to install the filter at the front section of the valve to avoid foreign materials to block the valve and affect the operation of the valve.
※King-Tech reserves the right to make any revisions on the valve model and size without prior notification.
※When making any design drawing, installation drawing or construction drawing, please do get our approved CAD with our signature, or we will not be responsible for any mistake.

Kv/Cv Value

Size	Cv	Kv
DN50 (2")	66	57
DN65 (2.5")	100	86
DN80 (3")	140	120
DN100 (4")	240	205
DN125 (5")	460	395
DN150 (6")	590	510

Size	Cv	Kv
DN200 (8")	990	850
DN250 (10")	1575	1355
DN300 (12")	2290	1970
DN350 (14")	3060	2630
DN400 (16")	4000	3440
DN500 (20")	5700	4900

$$\text{Kv or Cv} = \frac{Q}{\sqrt{\Delta P}}$$

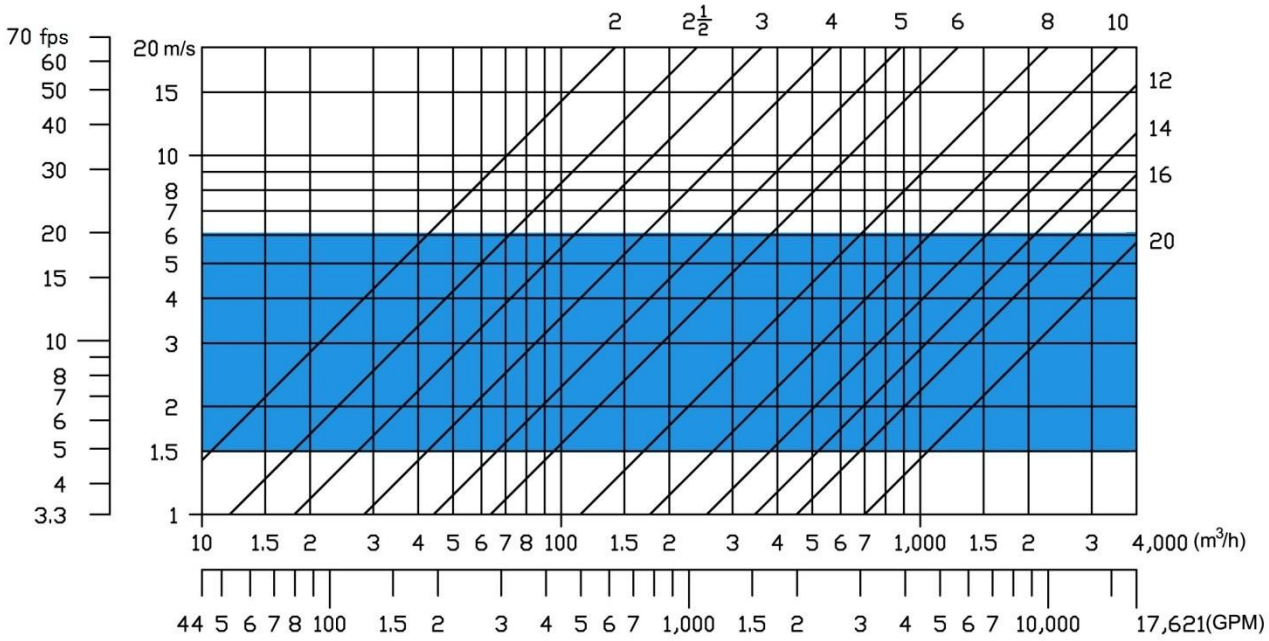
Kv=Cv×0.86

1 kg/cm^2=14.22 psi

Cv = US GPM @ 1 psi with 60 °F water

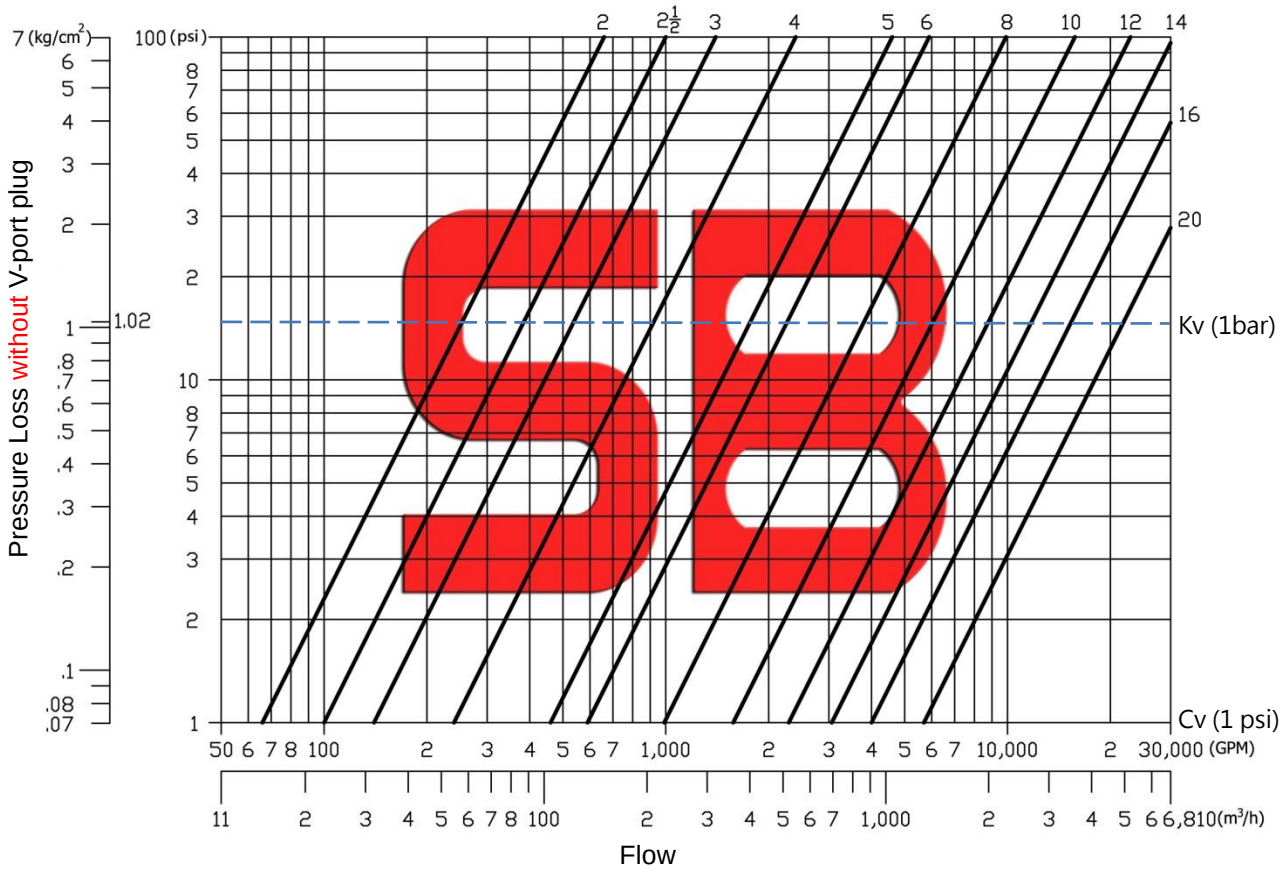
Kv = m^3/h @ 1 bar with 15 °C water

Valve Sizing Method

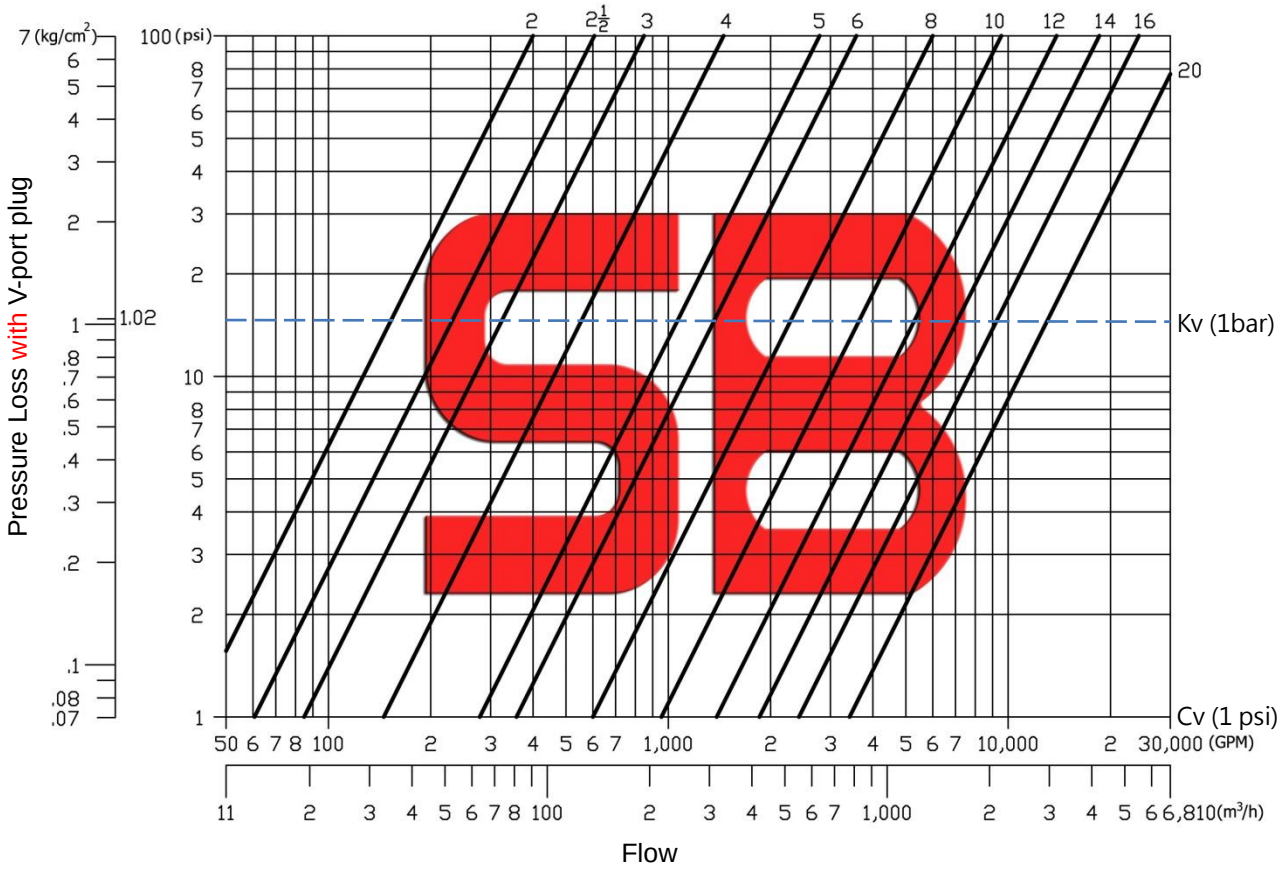


1. Write down your flow, for example your application is 800 GPM (182 m^3/h)
2. Calculate pressure difference (ΔP) between valve inlet and outlet. For example your application's pressure difference is 4 psi (0.28 kg/cm^2)
3. Calculate Cv(Kv) : This example should be $Cv = \frac{Q}{\sqrt{\Delta P}} = \frac{800}{\sqrt{4}} = 400$ or $Kv = \frac{Q}{\sqrt{\Delta P}} = \frac{182}{\sqrt{0.28}} = 344$
4. Decide Valve size. Chose those valve which Cv (Kv) Value are greater than the Cv (Kv) you calculated at Step 3. In general, the valve's Cv (Kv) value should be 1.4 times than the Cv (Kv) value you calculated. In this case, you should choose DN150 (6"), which Cv value is 590, Meet your requirement.
5. Check flow velocity. Having decide valve, you may check flow velocity. This case's velocity should be 9.4 fps (2.86m/s) this value may read from above photo.
6. Make your decision. Depending on your application, velocity flow through valve may different. In general, application such as pressure relief, velocity should be greater than normal. So valve size should be smaller than you have calculated at Step 4. In this case, you should choose DN125 (5"). If you need those modulating valve, such as pressure reducing valve, suggested velocity should beyond the shadow area of the above photo. In this case, DN150 (6") should be chosen, and if you have chosen an optional V-port plug, you should use DN200 (8"). If your valve are similar with Solenoid Control valve, which act as an ON/OFF valve, velocity should below 6.5 fps (2m/s). In this case DN200 (8") should be chose.

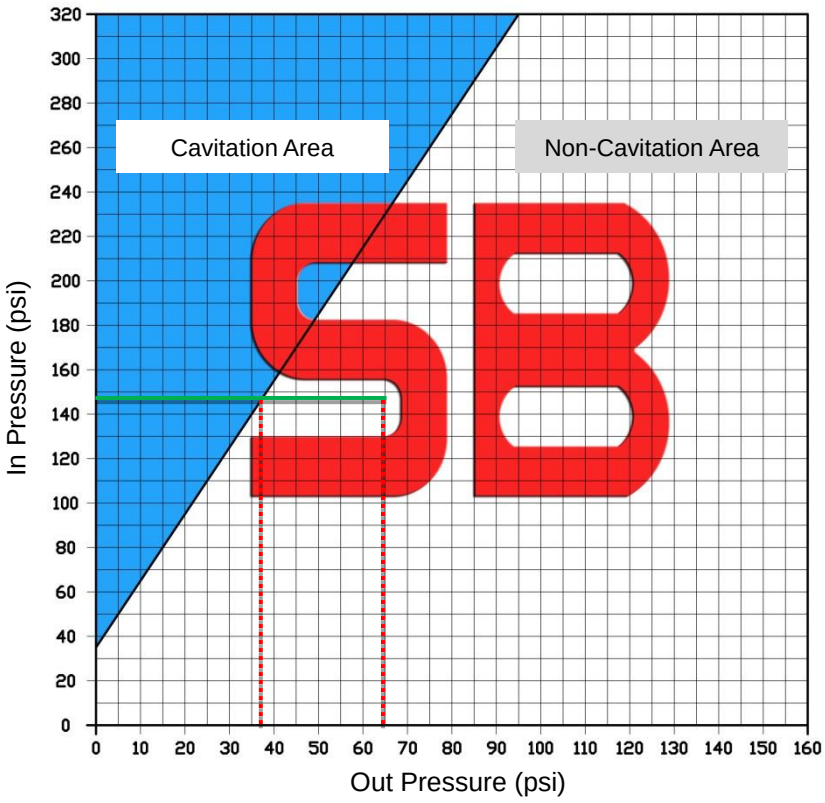
Pressure Loss Curve - Standard



Pressure Loss Curve - V-port Plug



Cavitation Area



How to use

1. Write down upstream pressure, for example, 147 psi (10.3 kg/cm^2)
2. Draw a horizontal line till it intersect with the bound of the shadow.
3. Read the outlet pressure valve of this intersect point. In this case should be 37 psi (2.6 kg/cm^2)
4. The outlet pressure should greater than this valve to avoid cavitation. for example, 65 psi (4.6 kg/cm^2)

About Cavitation

While acting as Pressure Reducing Valve or Pressure Relief Valve, cavitation may occur if pressure difference between valve's inlet and outlet is greater enough.

When water flow across valve seat and disk at high speed, water pressure will drop down. If pressure drops below the vapor pressure, vapor bubbles maybe formed. These bubbles will generate terrible damage to valve's parts. And cavitation may cause vibration and noise.

Preventing Cavitation

A. Increase downstream pressure if possible.
B. Select a larger valve in order to decrease flow velocity.
C. Use more valves in parallel to reduce inlet pressure.
D. For pressure reducing application, use more valves in serial to decrease theΔP through a single valve.

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