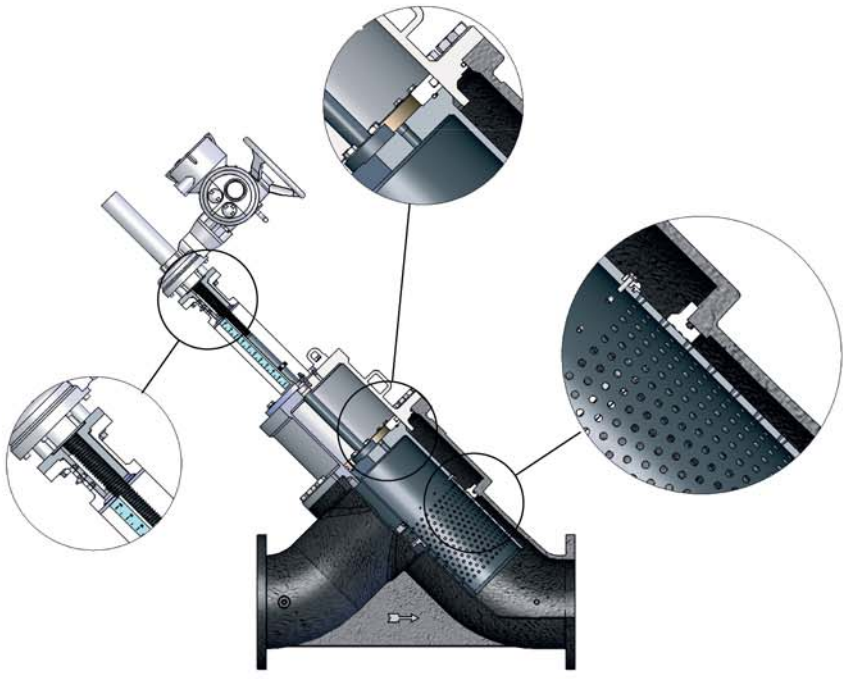
B5 SLEEVE VALVE

Model B-5 Sleeve Valve
Y Pattern Configuration

BAILEY VALVE INC
moving water forward

INTRODUCTION

The Bailey Valve Model B-5 sleeve valve has been designed to incorporate features that provide superior valve performance for inline flow control and pressure reduction applications. Typical applications for the model B-5 are water treatment plant flow control, pump control, tank level control, metering vaults, reservoir discharge and ground water recharge. The Bailey model B-5 valve dissipates energy and controls flow by diverting the water path through a perforated movable sleeve. The valve modulates by sliding the sleeve through a seat ring to expose a varying amount of nozzle area. The sleeve is designed with multiple sized and spaced tapered nozzles for each specific project and possesses a 1:1 stroke to diameter ratio for high turndowns. This design controls cavitations by directing damaging implosions away from any metallic surfaces, thus reducing vibration and noise normally associated with modulating valves. The nozzles are placed within the sleeve in a helical pattern that allows for specifically desired incremental volume change with movement of the sleeve. Each sleeve nozzle configuration is designed for the application needs to produce superior flow and pressure control over the entire requested flow range. Flow passes through tapered nozzles in the sleeve and energy is dissipated during a mixing process in the center of the valve. The advance and retract movement of the sleeve may be accomplished by an operator shaft, hydraulic cylinder, or integral piston located on top of the valve. The Bailey Valve model B-5 is capable of flowing from 20 GPM to 10,600 GPM.



Size Range:
3" (80mm) through 12" (300mm)

Standard Materials:
Valve Body: Epoxy Coated Carbon Steel or Ductile Iron
Sleeve: 304 or 316 Stainless Steel
Seat Ring: Stellite Hardfaced 304 or 316 Stainless Steel
Seals: Buna-N

Pressure Class:

ANSI B16.5	Working Press
Class 150	275 PSI
Class 300	720 PSI
Class 600	1440 PSI

DATA MODELS

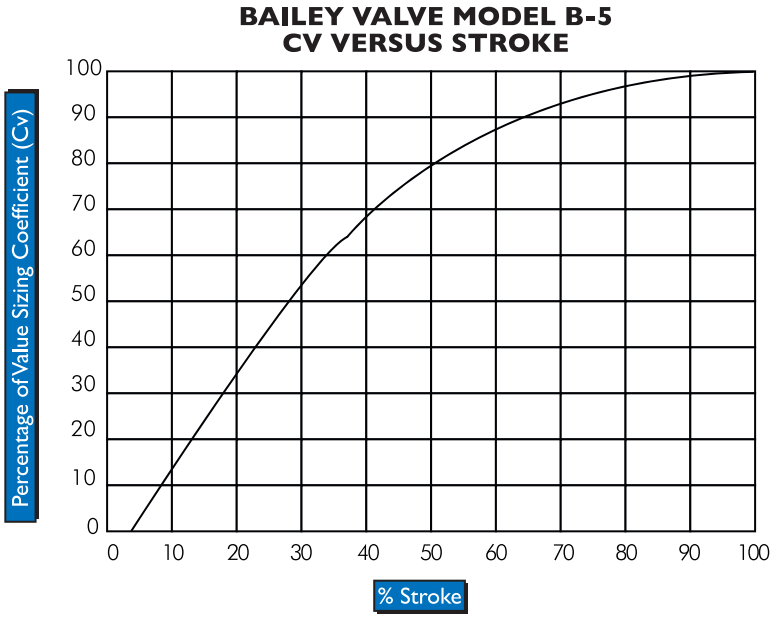


Table 1

Value Size		Flow Rate Data			
(in)	(mm)	gpm	cfs	mgd	cms
3	80	661	1.47	0.95	0.04
4	100	1174	2.62	1.69	0.07
6	150	2642	5.89	3.81	0.17
8	200	4698	10.47	6.76	0.30
10	250	7340	16.35	10.57	0.46
12	300	10570	23.55	15.22	0.67

Table 2

Valve Size		Flow Coefficient (Cv)*						
(in)	(mm)	gpm/$\sqrt{psi}$	cfs/$\sqrt{psi}$	mgd/$\sqrt{psi}$	gpm/$\sqrt{ft}$	cfs/$\sqrt{ft}$	mgd/$\sqrt{ft}$	cms/$\sqrt{m}$
3	80	132	0.29	0.19	87	0.19	0.12	0.010
4	100	234	0.52	0.34	154	0.34	0.22	0.018
6	150	526	1.17	0.76	346	0.77	0.50	0.040
8	200	935	2.08	1.35	616	1.37	0.89	0.070
10	250	1461	3.26	2.10	962	2.14	1.39	0.110
12	300	2104	4.69	3.03	1385	3.09	2.00	0.158

** Cv values are not guaranteed. They are typical and within 5%*

FEATURES

1:1 Stroke To Diameter Ratio:

- Provides better flow control over short stroke configuration by increasing the sleeve nozzle spacing
- Reduces the risk of oscillating on the seat under low flow and high delta P condition
- Allows for more cavitation dissipation inside valve compared to shorter stroke valves
- Reduces vibration by spreading discharge energy over broader range compared to shorter stroke valves
- High flow turndown allows the use of one valve in lieu of multiple parallel valves.

Stellite Hardfaced Seat Ring:

- Provides superior hard surface edge to reduce high velocity erosion of the seat ring
- Creates dissimilar hardness in non-bound mating materials
- Provides leading edge hardness sufficient to shear debris within the nozzle

Custom Valve Configuration:

- Allows for flange matching between valve and associated piping
- Multiple access options
- Valve material options (Ductile Iron, Stainless Steel)

Actuation Configurations:

- Electric Motor Operated
- Oil Hydraulic Operated w/ Hydraulic Power unit
- Water Hydraulic Operated from pipeline pressure

Valve Function:

- Pressure reduction
- Pressure sustaining
- Flow control

SLEEVE VALVE SIZE

Once the Bailey valve configuration (Inline, Y-Pattern, submerged, angle or non-modulating) has been selected, the next step in choosing the best solution for the application is sizing the valve for the operating conditions. This is first done by collecting key data, which will be used to determine the severity of cavitation as indicated by the cavitation index sigma (σ), velocity flow and flow capacities (Cv).

Step 1 - Data

Maximum Flow Rate ➡ Qmax
Inlet Pressure at Qmax ➡ Pi @ Qmax

Outlet Pressure at Qmax ➡ Po @ Qmax
Minimum Flow Rate ➡ Qmin

Inlet Pressure at Qmin ➡ Pi @ Qmin
Outlet Pressure at Qmin ➡ Po @ Qmin

Step 2 - Sigma

The sigma value or cavitation index is calculated and used to configure the performance class of sleeve valve or to determine if alternate options such as ball valves or butterfly valves are acceptable for the application conditions. The following equation is used to calculate the sigma value:

$$\sigma = Po - Pv \,/\, Pi - Po$$

Where:
Pi = Inlet Pressure (psig)
Po = Outlet Pressure (psig)
Pv = Vapor pressure (-14.6 psig for 60°F water at sea level)

** Contact Factory for assistance if σ is less than 0.15*

Step 3 - Velocity Flow

The maximum flow rate (Qmax) is compared to Table 1 to determine the corresponding valve size based on an allowable continuous velocity of 30 ft/sec through the valve port. Higher velocities can be attained for intermittent operating conditions and it is recommended that you contact the factory for sizing. Your flow rate should be rounded up to the next table size and corresponding value size noted (or recorded). Various units are provided for simplicity.

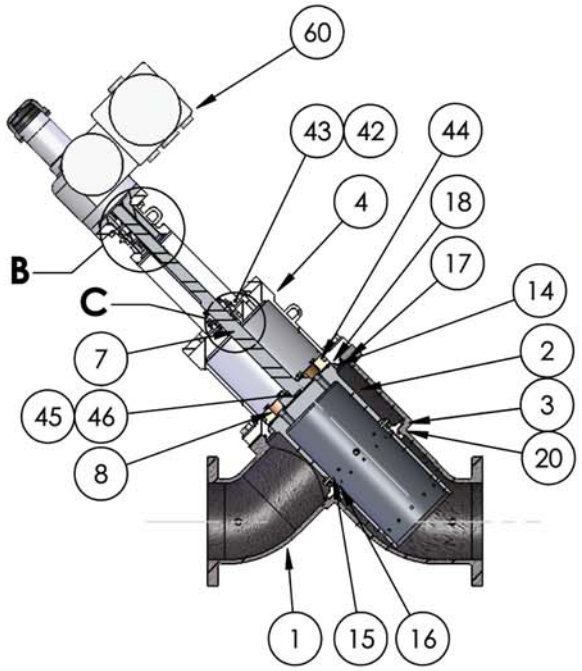
Step 4 - Flow Capacities (Cv)

The maximum flow rate (Qmax) and associated inlet pressure (Pi) and outlet pressure (Po) are used to calculate the required Flow Capacity of Cv of the application. The Cv equation is as follows:

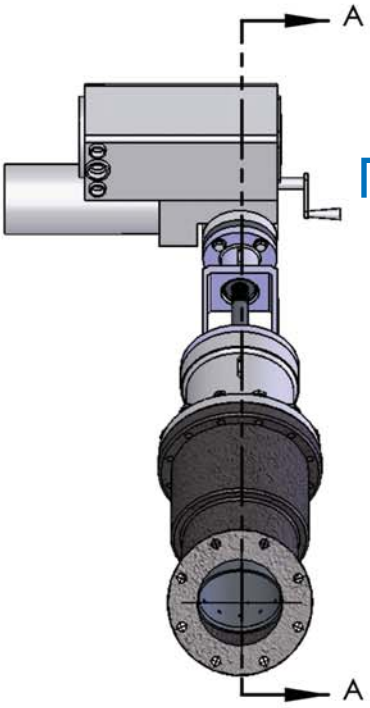
$$Cv = Q \,/\, \sqrt{(Pi\text{-}Po)}$$

Once the application Cv is calculated from the above equation, a safety factor of 20% is added to the value for valve Cv deviation and potential nozzle fouling from entrapped debris within the flow media. The Cv plus 20% value (C20) is compared to table 2 to determine the appropriate valve size for the application. The chosen valve size must have a higher capacity than the C20 calculated form the operationg conditions. The valve size chosen from the Cv table is then compared to the valve size chosen from the previous table1 and the larger of the two valves is the correct size for the application conditions.

PARTS

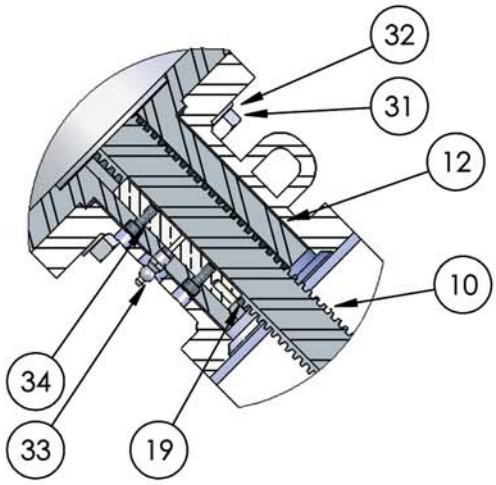


SECTION A-A

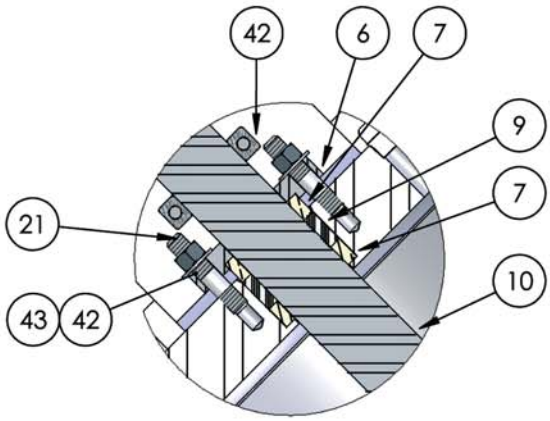


Innovation Drives our Design

At Bailey Valve, our job is to deliver quality sleeve valves along with the proper field support, allowing a seamless intergration for water control.



DETAIL B



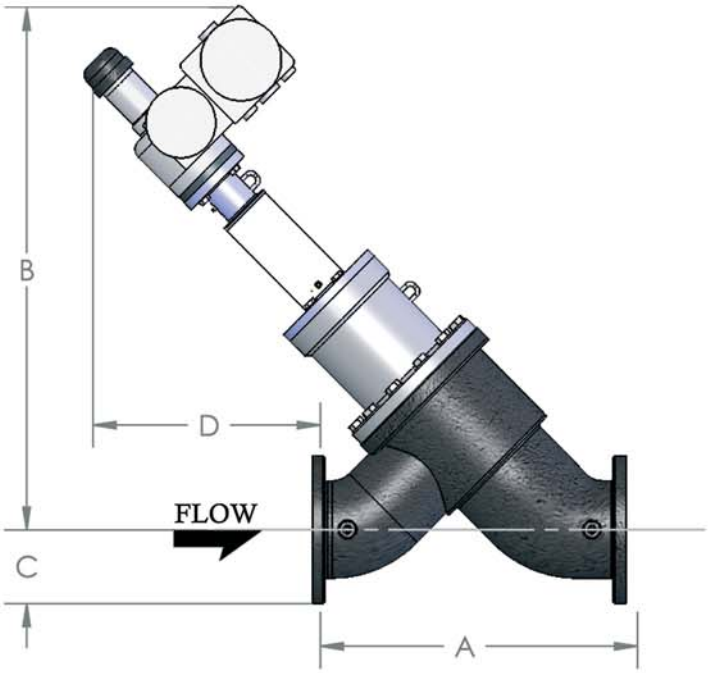
DETAIL C

PARTS LIST

Item NO.	Description	Typical Materials
1	Body	ASTM-A536
2	Sleeve	ASTM-A240 TYPE 304L
3	Seat Ring	ASTM-A240 TYPE 304L, Stellite 6
4	Cylinder	304 SS
6	Gland	ASTM-A240 TYPE 304
7	Gland Ring	ASTM B139 Alloy 51000
8	Bearing Plate	ASTM B139 Alloy 54400
9	Packing	GARLOCK
10	Operator Shaft	304 SS
11	Stem Housing	ASTM-A36, A53 Gr B
12	Torque Device	ASTM-A240 TYPE 304
13	Collar	316 SS
14	O-Ring	BUNA-N
15	Seat Retainer	ASTM-A240/A276 TYPE 304L
16	Resilent Seal-30 inches	BUNA-N
17	O-Ring	BUNA-N
18	Polypak	MOLYTHANE
19	Key	ALUMINUM BRONZE
20	O-Ring	BUNA-N
21	Tap-end Stud	18/8 SS
24	Scale	LAMINATE
26	Hex Bolt	304 SS
31	Hex Bolt	316 SS
24	Hex Bolt	304 SS
32	Flat Washer	18/8 SS
33	Grease Fitting	STEEL
34	Socket Head Cap Screw	316 SS
38	Pipe Cap	MALLEABLE CAST IRON
40	Flat Washer	316 SS
41	Hex Bolt-Drilled	18/8 SS
42	Flat Washer	316 SS
43	Hex Nut, Finished	304 SS
45	Flat Washer	316 SS
46	Hex Bolt Drilled	304 SS
48	Hex Bolt, Finished	304 SS
49	Flat Washer	18/8
50	Socket Head Cap Screw	304 SS
51	Socket Head Cap Screw	304 SS
60	Electric Actuator	-
61	Stem Pipe	ASTM-A53
70	Pipe Plug	18/8 SS
71	Pipe Plug	18/8 SS

Innovative products & improvements are our benchmark.

DIMENSIONS



Valve Size		Class 150 Dimensions									
		A		B		C		D		Weight	
in	mm	in	mm	in	mm	in	mm	in	mm	lbs	kg
3	80	16.30	414	18.50	470	3.80	97	11.00	279	200	91
4	100	18.00	457	21.80	554	4.50	114	14.00	356	265	120
6	150	23.00	584	28.50	724	5.50	140	17.00	432	465	211
8	200	29.00	737	48.00	1219	6.80	173	20.00	508	675	306
10	250	38.00	965	56.00	1422	8.00	203	22.00	559	925	420
12	300	45.50	1130	53.00	1346	9.50	241	23.00	584	1500	680

Valve Size		Class 300 Dimensions									
		A		B		C		D		Weight	
in	mm	in	mm	in	mm	in	mm	in	mm	lbs	kg
3	80	16.25	413	28.00	711	4.13	105	11	279	200	91
4	100	18.00	457	30.00	762	5.00	127	14	356	265	120
6	150	23.00	584	42.00	1067	6.25	159	17	432	465	211
8	200	29.00	737	48.00	1219	7.50	191	20	508	675	306
10	250	38.38	975	56.00	1422	8.75	222	22	559	925	420
12	300	46.00	1168	65.00	1651	10.25	260	23	584	1700	771

Contact Factory for Class 600 dimensions at: sales@baileyvalve.com

** values are dependent upon model of actuator used and are approximations only.*