B14 SLEEVE VALVE

Model B-14 Sleeve Valve
Wall Mount Configuration

BAILEY VALVE INC
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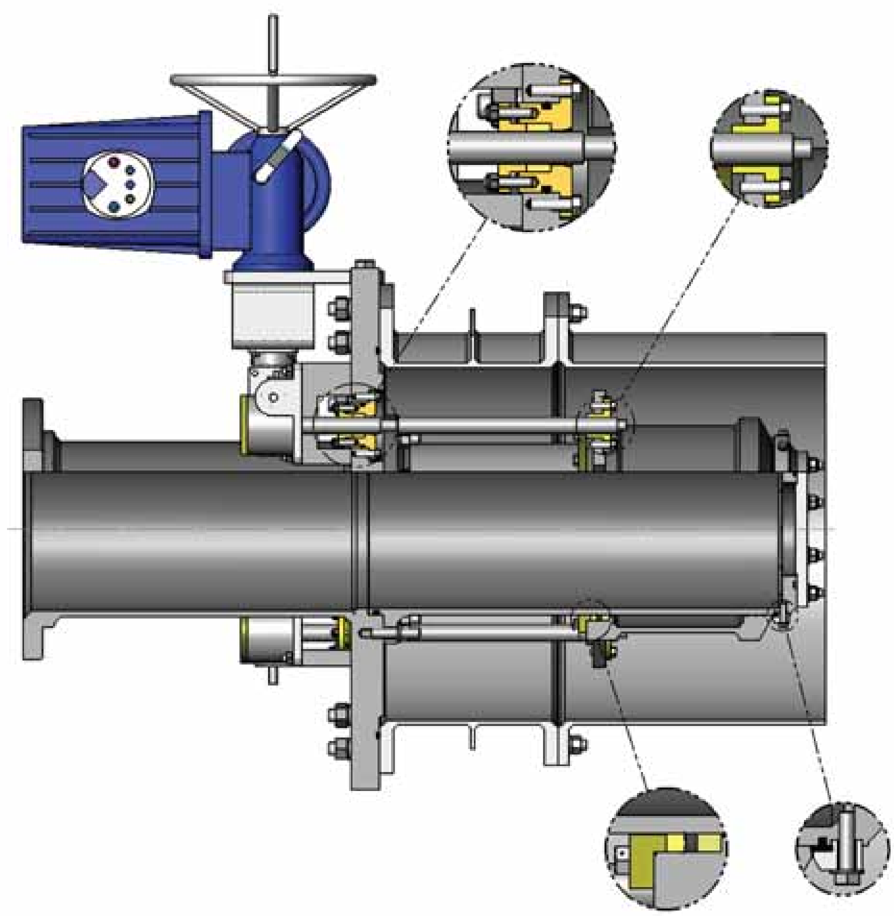
INTRODUCTION

The Bailey Valve Model B-14 sleeve valve has been designed to incorporate features that provide superior valve performance for atmospheric or submerged discharged in flow and pressure reduction applications. Typical applications for the model B-14 are turbine bypass, reservoir discharge and ground water recharge. The Bailey model B-14 valve dissipates energy and controls flow by diverting the water through multiple orifices located within the sleeve and discharging to atmosphere or body water. The valve modulates by sliding an outer pipe called the gate over an inner pipe called the sleeve. The sleeve is designed with multiple sized and spaced tapered nozzles for each specific project. This design controls cavitation 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 gate. 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 from the inside of the valve out through tapered nozzles in the sleeve and energy is dissipated outside of the valve body. The advance and retract movement of the gate is accomplished through two (2) drive screws or hydraulic cylinders located on each side of the valve. The Bailey Valve model B-14 is capable of flowing from 500 GPM to 443,939 GPM.



Size Range:
8" (200mm) through 60" (1500mm)

Standard Materials:
Inlet Body: Epoxy Coated Carbon Steel
Shroud: 304 or 316 Stainless Steel
Gate: Stellite Hardfaced 304 or 316 Stainless Steel
Seat Ring: 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

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DATA MODELS

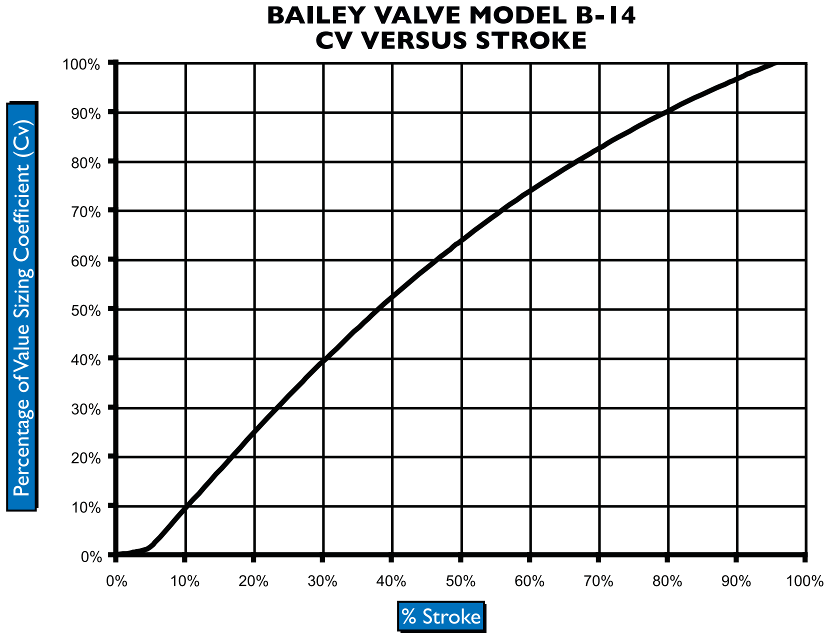


Table 1

Valve Size (in)	Valve Size (mm)	Flow Rate (Based on 30 ft/sec port velocity) gpm	cfs	mgd	cms
8	200	4700	10.5	6.8	0.30
10	250	7360	16.4	10.6	0.46
12	300	10600	23.6	15.2	0.67
14	350	14400	32.1	20.7	0.91
16	400	18800	41.9	27.0	1.19
18	450	23900	53.2	34.3	1.51
20	500	29500	65.7	42.4	1.86
24	600	42400	94.4	60.9	2.67
30	750	66300	148	95	4.18
36	900	95400	212	137	6.02
42	1000	130000	290	187	8.20
48	1200	170000	379	244	10.72
54	1400	215000	479	309	13.6
60	1500	265000	590	381	16.7
66	1700	319000	710	458	20.1
72	1800	380000	846	546	24.0

Table 2

Valve Size (in)	Valve Size (mm)	Flow Coefficient (Cv)* gpm/√psi	cfs/√psi	mgd/√psi	gpm/√ft	cfs/√ft	mgd/√ft	cms/√m
8	200	1230	2.74	1.77	810	1.80	1.16	0.09
10	250	1922	4.28	2.76	1265	2.82	1.82	0.14
12	300	2770	6.20	3.98	1824	4.06	2.62	0.21
14	350	3770	8.40	5.42	2482	5.53	3.57	0.28
16	400	4920	11.00	7.07	3239	7.21	4.65	0.37
18	450	6230	13.9	9.0	4102	9.1	5.89	0.47
20	500	7690	17.1	11.0	5063	11.3	7.27	0.58
24	600	11070	24.7	15.9	7288	16.2	10.5	0.83
30	750	17300	38.5	24.9	11390	25.4	16.4	1.30
36	900	24900	55.5	35.8	16394	36.5	23.6	1.87
42	1000	33900	75.5	48.7	22319	49.7	32.1	2.55
48	1200	44300	98.7	63.7	29166	65.0	41.9	3.33
54	1400	56000	125	80.5	36869	82.1	53.0	4.21
60	1500	69200	154	99	45560	101	65.5	5.21
66	1700	83700	186	120	55106	123	79.2	6.30
72	1800	99700	222	143	65640	146	94.3	7.50

** 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 (Carbon Steel, 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.

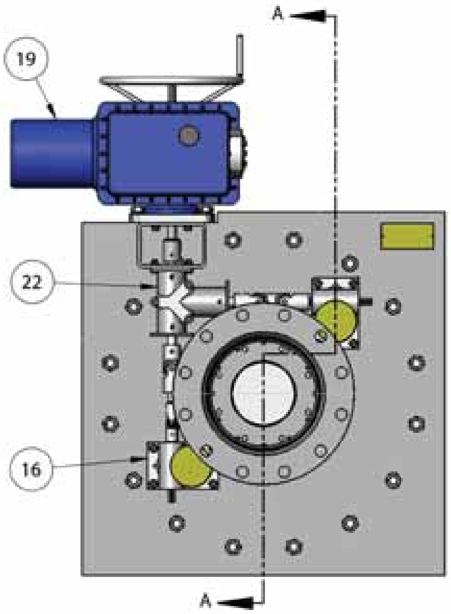
Step 4 - Flow Capacities (Cv)

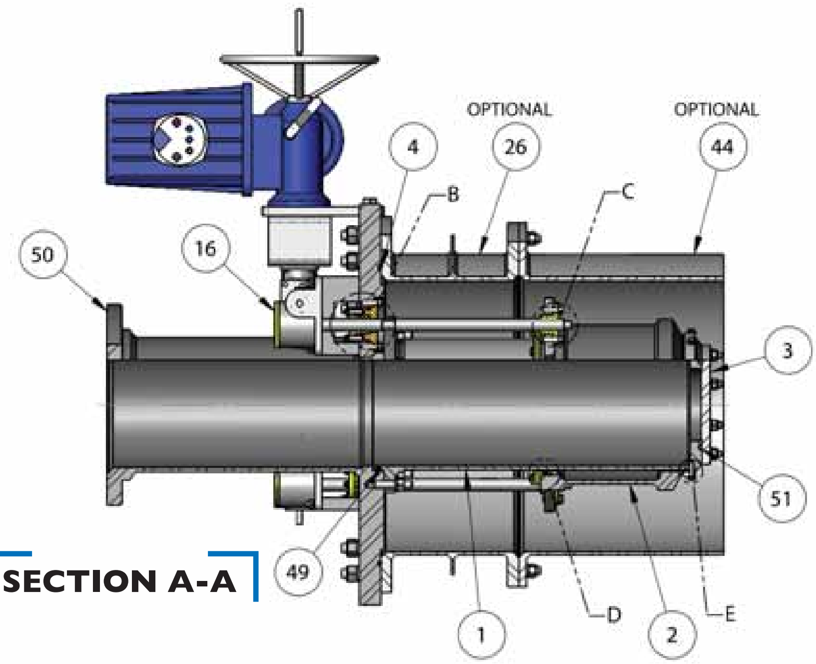
The maximum flow rate (Qmax) and associated inlet pressure (Pi) and outlet pressure (Po) are used to calculate the required Flow Capacity of Cv of the application. The Cv equation is as follows:

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

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 potentional 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.

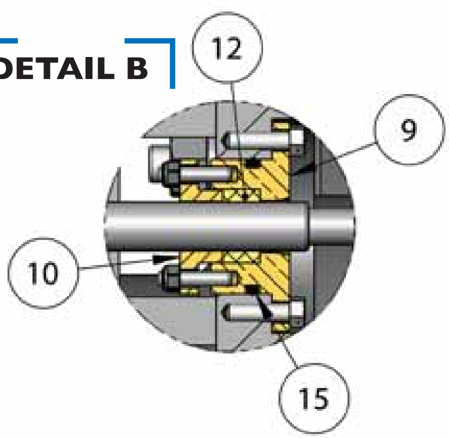
PARTS



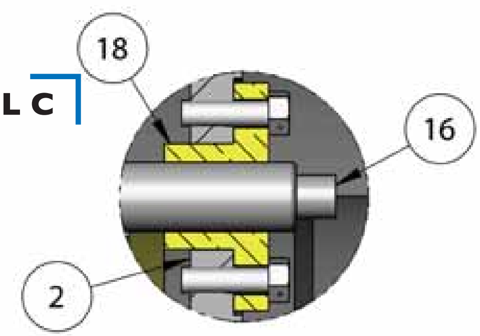


SECTION A-A

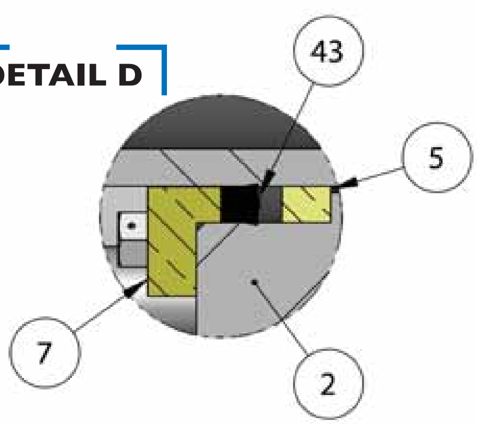
DETAIL B



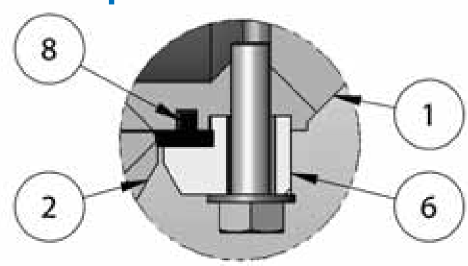
DETAIL C



DETAIL D



DETAIL E



PARTS LIST

Item NO.	Description	Typical Materials
1	Valve Body	304L SS
2	Valve Gate	304L SS, Stellite 6
3	Cover	304 SS
4	O-Ring	Buna-N (70 Duro)
5	Scraper Ring	Bronze
6	Seat Ring, 2 Piece	304L SS
7	Gland	Bronze
8	T-Seal	Buna-N (70 Duro)
9	Stuffing Box	Bronze
10	Gland	Bronze
11	Tap-end Stud	18-8 SS
12	Packing	Garlock #432
13	Elastic Stop Nut	18-8 SS / Nylon
14	Hex Head Capscrew (Drilled)	316 SS
15	O-ring	Buna-N (70 Duro)
16	Lift Jack	Steel/SS Shaft
17	Spacer, Lift Jack	304 SS
18	Lift Nut	Bronze
19	Electric Motor Actuator	~
20	U-Joint Assy	Steel
21	Shaft Adapter	304 SS
22	Bevel Gear	~
23	U-Joint Assembly	Steel
24	U-Joint	Alloy Steel
25	Actuator Bracket	Steel
26	Wall Embed	Steel
27	Tap-end Stud	304 SS
28	Flat Washer	304 SS
29	Nut -Elastic Stop	18-8 SS
30	Flat Washer	304 SS
31	Hex Head Capscrew - Drilled	304 SS
32	Tap-end Stud	304 SS
33	Lock Washer - Split Ring	18/8 SS
34	Hex Nut	304 SS
35	Hex Head Capscrew	18/8 SS
36	Tap End Stud	18-8 SS
37	Lock Washer - Split Ring	18/8 SS
38	Hex Nut	18-8 SS
39	LockWasher - Split Ring	18-8 SS
40	Hex Nut	18/8 SS
41	Hex Head Capscrew	18/8 SS
42	Hex Head Capscrew	18/8 SS
43	Polypak	Urethane
44	Shroud	304L SS
45	Tap-end Stud	304 SS
46	Lock Washer - Split Ring	304 SS
47	Hex Nut	304 SS
48	Tap-end Stud	304 SS
49	O-Ring	Buna-N (70 Duro)
50	Inlet Body	Steel
51	O-Ring	70 Durometer Buna-N
52	Nameplate	304 SS
55	Stem Adapter	304 SS
56	Set Screw	18-8 SS
57	Set Screw	18-8 SS
58	Key	304 SS
59	Key	304 SS

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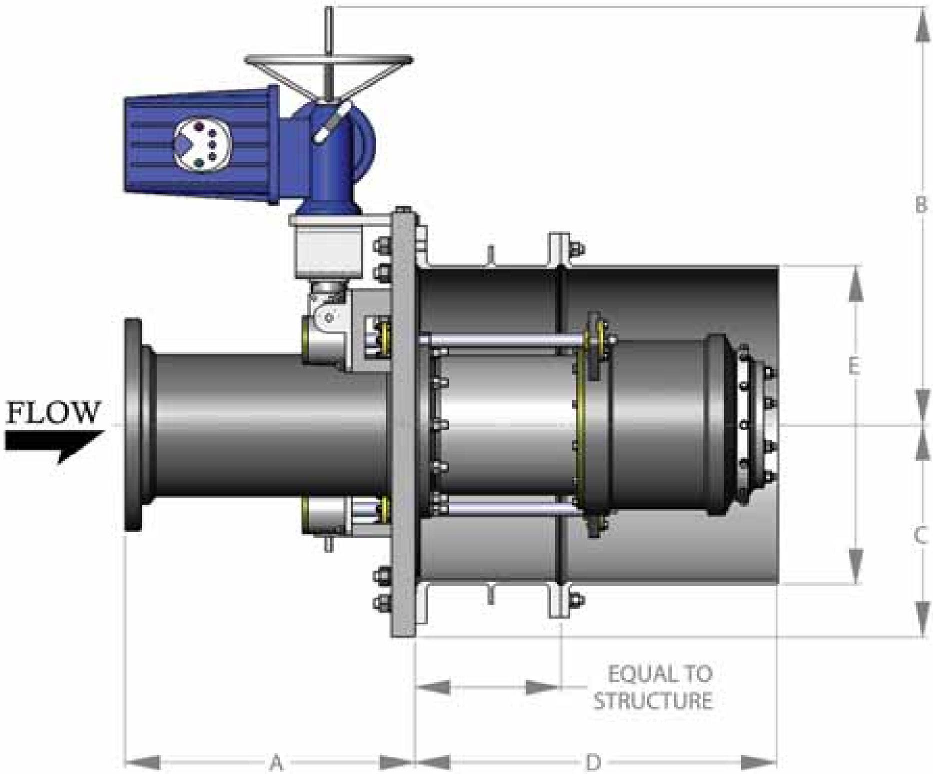
DIMENSIONS



Valve Size		A		B		C		D		E	
(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)
8	200	22.00	560	30.00	760	16.00	405	27.00	685	24.00	610
10	250	22.00	560	31.50	800	16.00	405	27.25	690	24.00	610
12	300	24.00	610	33.50	850	18.00	460	42.00	1070	28.00	710
14	350	26.00	660	36.00	910	19.00	480	49.00	1250	30.00	760
16	400	28.00	710	38.00	970	21.00	530	56.00	1420	36.00	920
18	450	30.00	760	40.00	1020	25.00	640	63.00	1600	42.00	1070
20	500	32.00	810	42.00	1070	26.50	670	70.00	1780	45.00	1140
24	600	36.00	910	46.00	1170	31.00	790	84.00	2130	54.00	1370
30	750	42.00	1070	52.00	1320	37.00	940	105.00	2670	66.00	1680
36	900	48.00	1220	58.00	1480	44.00	1120	126.00	3200	80.00	2030
42	1000	54.00	1400	64.00	1630	49.00	1250	147.00	3730	90.00	2290
48	1200	60.00	1500	70.00	1780	58.00	1480	168.00	4270	108.00	2740
54	1400	66.00	1700	76.00	1930	66.00	1680	189.00	4800	124.00	3150
60	1500	72.00	1800	82.00	2080	72.00	1830	210.00	5330	136.00	3450