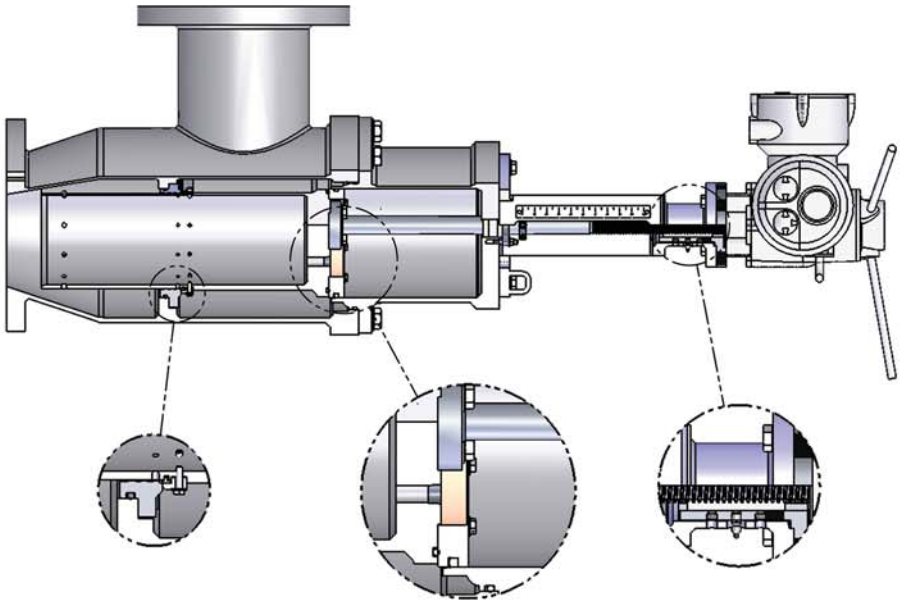
B12 SLEEVE VALVE

Model B-12 Sleeve Valve
Angle Configuration

BAILEY VALVE INC
moving water forward

INTRODUCTION

The Bailey Valve model B-12 sleeve valve has been designed to incorporate features that provide superior valve performance for angle flow control, pump control, tank level control, metering vaults, reservoir discharge and ground water recharge. The Bailey model B-12 valve dissipates energy and controls flow by diverting the water path around a sleeve and into a valve body. The valve modulates flow by sliding a pipe called the sleeve through a seat ring. 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 through tapered nozzles in the sleeve and energy is dissipated during a mixing process in the center of the valve prior to exiting the valve body. The advance and retract movement of the gate is accomplished through one (1) drive screw or hydraulic cylinder located on the top of the valve. The bailey Valve model B-12 is capable of flowing from 500 GPM to over 380,000 GPM.



Size Range:
8" (200mm) through 72" (1830mm)

Standard Materials:
Valve Body: Epoxy Coated Carbon Steel
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

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DATA MODELS

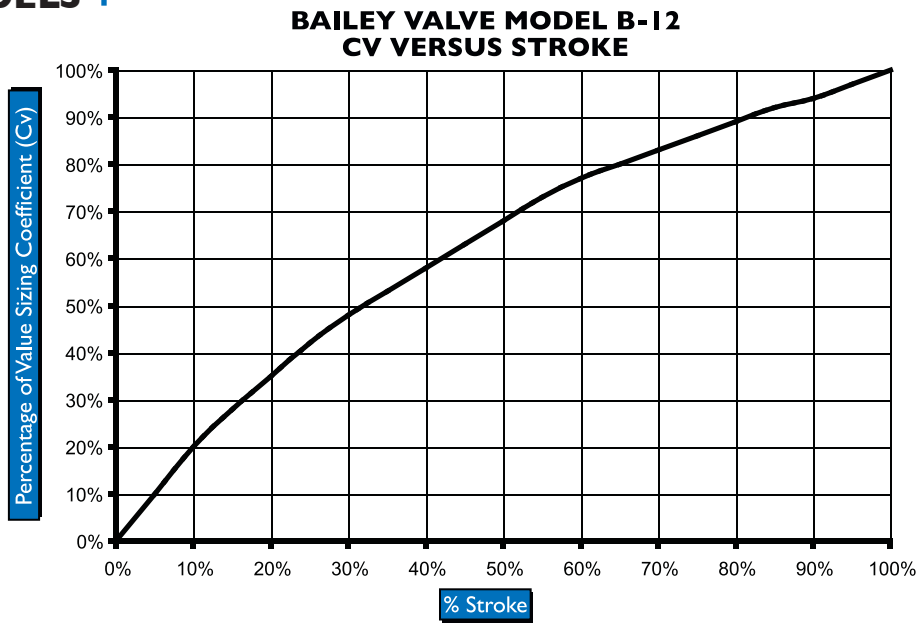


Table 1

Valve Size		Flow Rate (Based on 30 ft/sec port velocity)			
(in)	(mm)	gpm	cfs	mgd	cms
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
14	350	14387	32.05	20.72	0.91
16	400	18791	41.87	27.06	1.19
18	450	23782	52.99	34.25	1.50
20	500	29361	65.42	42.28	1.85
24	600	42280	94.20	60.88	2.67
30	450	66062	147.19	95.13	4.17
36	900	95130	211.95	136.99	6.00
42	1000	129482	288.49	186.46	8.17
48	1200	169120	376.80	243.53	10.67
54	1400	214042	476.89	308.22	13.51
60	1500	264249	588.75	380.52	16.67
66	1670	319742	712.39	460.43	20.17
72	1820	380519	847.80	547.95	24.01

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/$\sqrt{m}$
8	200	1177	2.62	1.70	775	1.73	1.12	0.09
10	250	1838	4.10	2.65	1210	2.70	1.74	0.14
12	300	2646	5.90	3.81	1741	3.88	2.51	0.20
14	350	3601	8.02	5.19	2370	5.28	3.41	0.27
16	400	4703	10.48	6.77	3095	6.90	4.46	0.35
18	450	5953	13.26	8.57	3917	8.73	5.64	0.45
20	500	7349	16.37	10.58	4836	10.78	6.96	0.55
24	600	10582	23.58	15.24	6964	15.52	10.03	0.80
30	450	16535	36.84	23.81	10882	24.24	15.67	1.24
36	900	23812	53.05	34.29	15670	34.91	22.57	1.79
42	1000	32411	72.21	46.67	21330	47.52	30.71	2.44
48	1200	42334	94.32	60.96	27860	62.07	40.12	3.18
54	1400	53580	119.38	77.16	35261	78.56	50.78	4.03
60	1500	66149	147.38	95.26	43533	96.99	62.69	4.97
66	1670	80042	178.33	115.26	52676	117.36	75.85	6.02
72	1820	95258	212.23	137.17	62689	139.67	90.27	7.16

** 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.

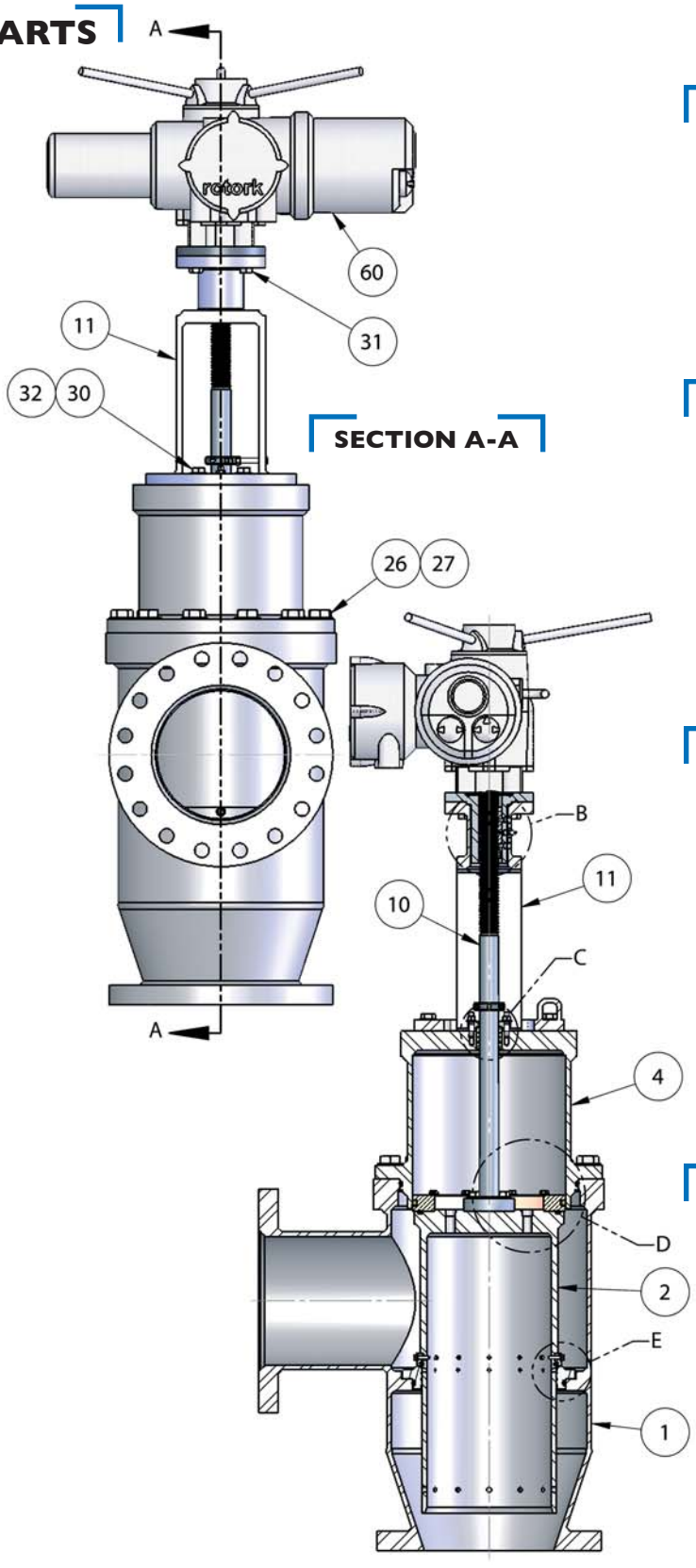
Step 4 - Flow Capacities (Cv)

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:

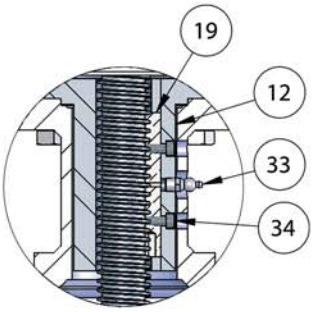
$$Cv = Q \,/\, \sqrt{(Pi\text{-}Po)}$$

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.

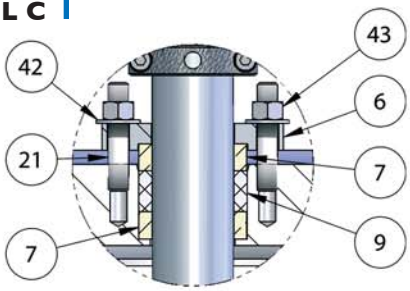
PARTS



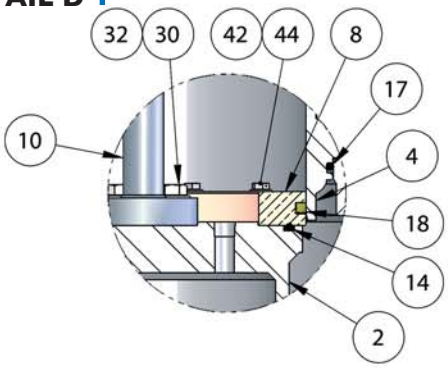
DETAIL B



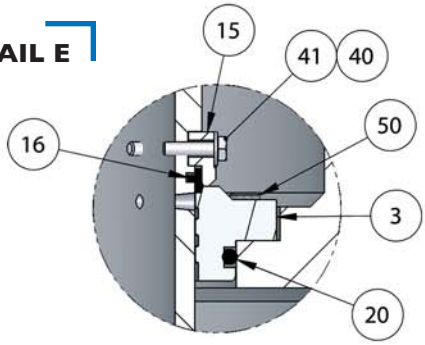
DETAIL C



DETAIL D



DETAIL E

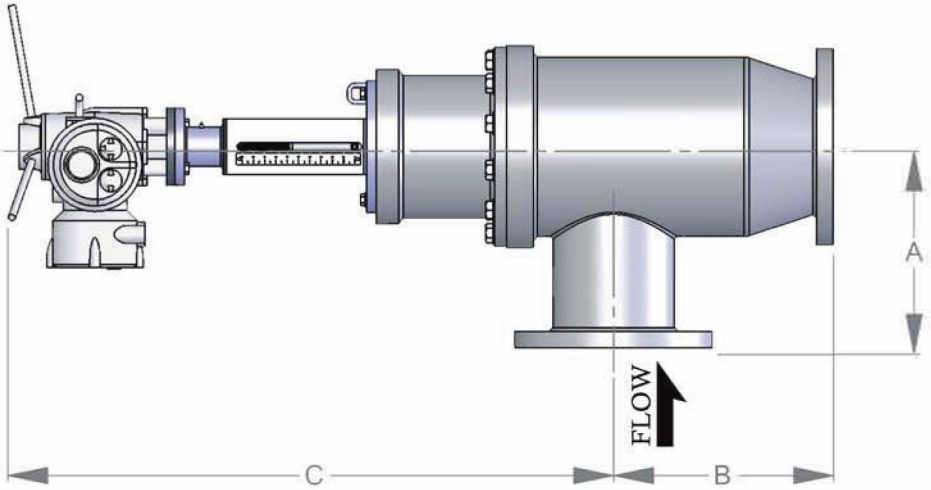


PARTS LIST

Item NO.	Description	Typical Materials
1	Valve Body	ASTM A36/A106 Gr B/A516 Gr 70
2	Sleeve	ASTM A240/A312 Type 304L
3	Seat Ring	ASTM-A240 Type 304L, Stellite 6
4	Cylinder	ASTM A240/A312 Type 304L
6	Gland	ASTM-A240 Type 304L
7	Gland Ring	ASTM B139 Alloy 51000
8	Bearing Plate	ASTM-B271 Alloy C95200
9	Packing, 4 Rings + Top & Bottom	Buna-N, Fiber
10	Operator Shaft	ASTM-A276 Type 304 SS
11	Stem Housing	ASTM-A36, A53 Gr B
12	Torque Device	ASTM-A276 Type 304 SS
13	Collar, 1.50 Dia. Shaft	316 SS
14	O-Ring	70 Durometer Buna-N
15	Seat Retainer	ASTM-A240 Type 304L
16	Resilent Seal	Buna-N, 70 Durometer
17	O-Ring	70 Durometer Buna-N
18	Polypak Seal	Molythane
19	Key	Aluminum Bronze
20	O-Ring	70 Durometer Buna-N
21	Tap-end Stud	316 SS
24	Scale	18/8 SS
26	Hex Bolt	316 SS
27	Flat Washer	316 SS
30	Hex Bolt	316 SS
31	Hex Bolt	316 SS
32	Flat Washer	316 SS
33	Grease Fitting, 1/8" Straight	303 SS
34	Socket Head Cap Screw	316 SS
40	Flat Washer	316 SS
41	Hex Bolt-Drilled	316 SS
42	Flat Washer	316 SS
43	Hex Nut	ASTM A194 Gr B8M
44	Hex Bolt-Drilled	316 SS
50	Socket Head Cap Screw	316 SS
51	Socket Head Cap Screw	316 SS
60	Actuator	~

Innovative products & improvements are our benchmark.

DIMENSIONS



Valve Size		A		B		C	
(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)
8	200	16	406	39	991	16	406
10	250	18	457	46	1168	20	508
12	300	20	508	53	1346	24	610
14	350	22	559	60	1524	27	686
16	400	24	610	67	1702	30	762
18	450	24	610	74	1880	36	914
20	500	24	610	81	2057	40	1016
24	600	30	762	95	2413	45	1143
30	750	36	914	116	2946	50	1270
36	900	42	1067	137	3480	64	1626
42	1000	48	1219	158	4013	78	1981
48	1200	54	1372	179	4547	88	2235
54	1400	60	1524	200	5080	98	2489
60	1500	66	1676	221	5613	108	2743
66	1670	72	1829	245	6223	118	2997