# B16 SLEEVE

**Model B-14**
**Sleeve Configuration**

BAILEY VALVE INC
moving water forward

## INTRODUCTION

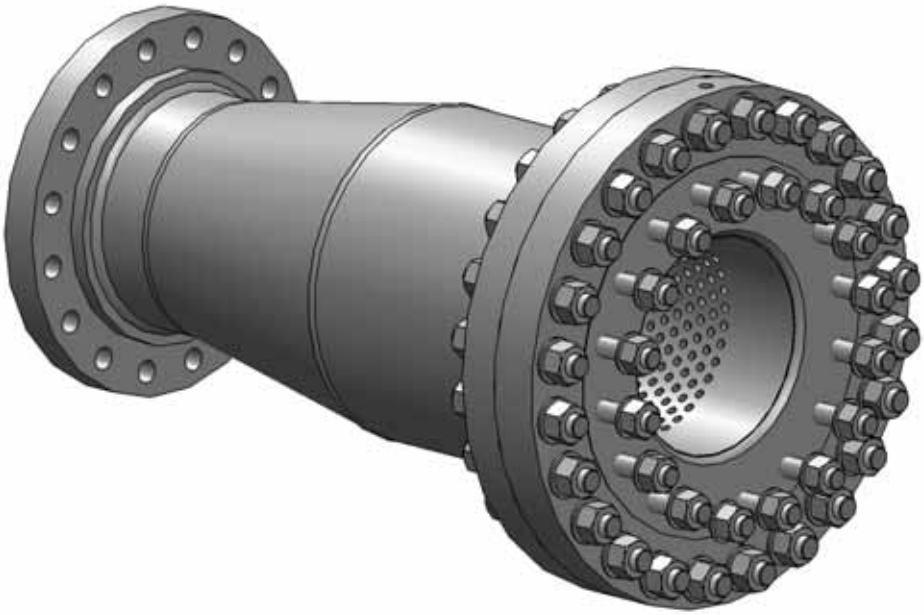
The Bailey Valve Model B-16 sleeve has been designed to incorporate features that provide superior performance for inline flow and pressure reduction applications. Typical applications for the model B-16 are turbine bypass, reservoir discharge and ground water recharge. The Bailey model B-16 valve dissipates energy and controls flow by diverting the water through multiple orifices located within the sleeve element. 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 valves. Each sleeve nozzle configuration is designed for the application needs to produce superior flow and pressure control over the requested flow range. Flow passes from the outside through tapered nozzles and energy is dissipated inside the valve. The Bailey Valve model B-16 is capable of operational use from 50 to 265,000 GPM.

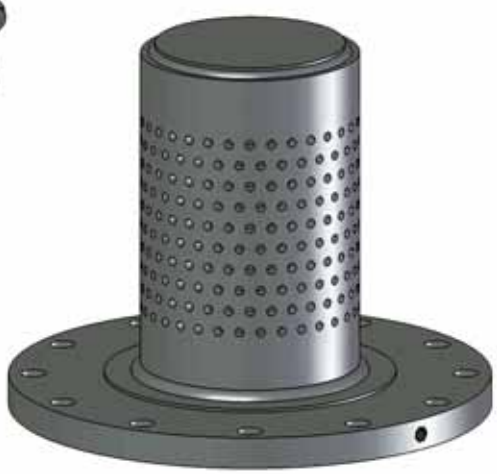
**Size Range:**
3" (80mm) through 60" (1500mm)

**Standard Materials:**
Sleeve Flange: Epoxy Coated Carbon Steel
304 or 316 Stainless Steel
Sleeve: 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

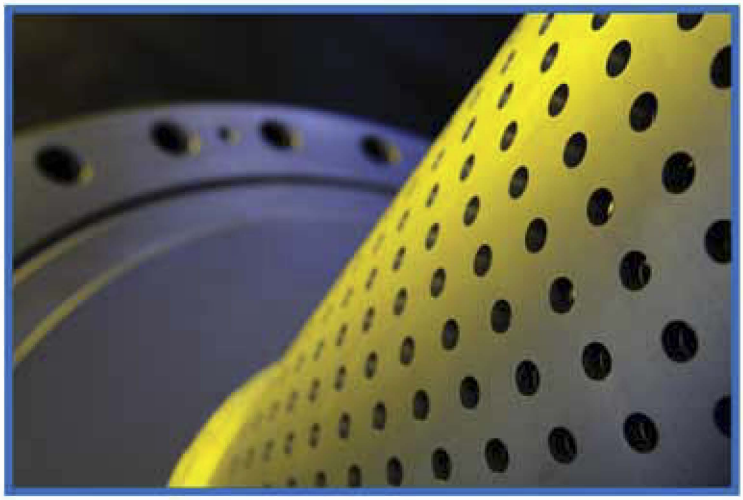


**Table 1**

| Size | | Flow Rate (Based on 30 ft/sec port velocity) | | | |
|---|---|---|---|---|---|
| (in) | (mm) | gpm | cfs | mgd | cms |
| 3 | 80 | 660 | 1.5 | 0.9 | 0.04 |
| 4 | 100 | 1170 | 2.6 | 1.7 | 0.07 |
| 6 | 150 | 2640 | 5.9 | 3.8 | 0.17 |
| 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 |

**Table 2**

| Size | | Flow Coefficient (Cv)* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (in) | (mm) | gpm/√psi | cfs/√psi | mgd/√psi | gpm/√ft | cfs/√ft | mgd/√ft | cms/√m |
| 3 | 80 | 131 | 0.29 | 0.19 | 86 | 0.19 | 0.12 | 0.01 |
| 4 | 100 | 234 | 0.52 | 0.34 | 154 | 0.34 | 0.22 | 0.02 |
| 6 | 150 | 526 | 1.17 | 0.76 | 346 | 0.77 | 0.50 | 0.04 |
| 8 | 200 | 936 | 2.08 | 1.34 | 616 | 1.37 | 0.89 | 0.07 |
| 10 | 250 | 1462 | 3.26 | 2.10 | 962 | 2.14 | 1.38 | 0.11 |
| 12 | 300 | 1767 | 6.20 | 2.54 | 1164 | 2.59 | 1.67 | 0.13 |
| 14 | 350 | 2412 | 5.37 | 3.47 | 1588 | 3.54 | 2.28 | 0.18 |
| 16 | 400 | 3150 | 7.02 | 4.53 | 2074 | 4.62 | 2.98 | 0.24 |
| 18 | 450 | 4746 | 10.6 | 6.8 | 3125 | 7.0 | 4.49 | 0.36 |
| 20 | 500 | 4922 | 11.0 | 7.1 | 3240 | 7.2 | 4.66 | 0.37 |
| 24 | 600 | 7087 | 15.8 | 10.2 | 4666 | 10.4 | 6.7 | 0.53 |
| 30 | 750 | 11073 | 24.7 | 15.9 | 7290 | 16.2 | 10.5 | 0.83 |
| 36 | 900 | 15945 | 35.5 | 22.9 | 10498 | 23.4 | 15.1 | 1.20 |
| 42 | 1000 | 21704 | 48.3 | 31.2 | 14289 | 31.8 | 20.5 | 1.63 |
| 48 | 1200 | 28347 | 63.1 | 40.7 | 18663 | 41.6 | 26.8 | 2.13 |
| 54 | 1400 | 35877 | 80 | 51.6 | 23621 | 52.6 | 33.9 | 2.70 |
| 60 | 1500 | 44293 | 99 | 64 | 29161 | 65 | 41.9 | 3.33 |

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

## FEATURES

### 1:1 Nozzle Area To Diameter Ratio:

- Provides better flow control by increasing the sleeve nozzle spacing
- Allows for more cavitation dissipation inside the valve
- Reduces vibration by spreading discharge energy over broader range

### Custom Configuration:

- Allows for flange matching between valve and associated piping
- Valve material options (Carbon Steel, Stainless Steel)

## 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 ($\sigma$), velocity flow and flow capacities (Cv).

### Step 1 - Data

Flow Rate → Q
Inlet Pressure → Pi

Outlet Pressure → Po

### 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 $\sigma$ 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)

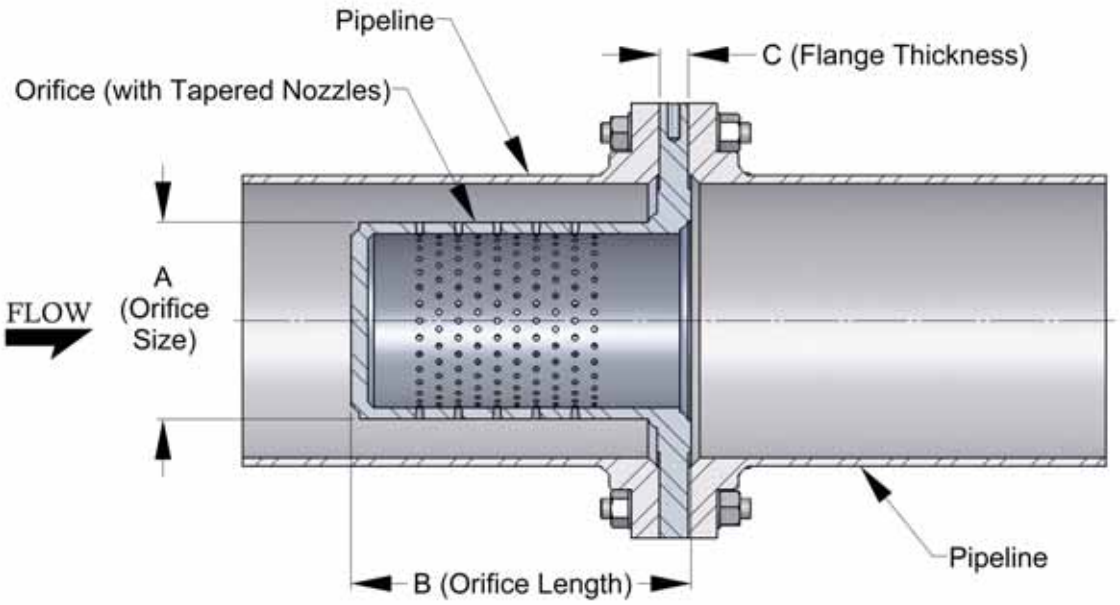
The maximum flow rate (Qmax) and associated inlet pressure (Pi) and outlet pressure (Po) are used to calculate the required Flow Capacity of Cv of the application. The Cv equation is as follows:

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

The Cv is compared to table 2 to determine the appropriate size for the application. The chosen size must have a higher capacity than the Cv calculated for the operating. The valve size chosen from the Cv table is then compared to the size chosen from the previous table 1 and the larger of the two is the correct size for the application conditions. The headloss at minimum required flow can then be calculated by using $\Delta P = \left(\frac{Qmin}{Cv}\right)^2$ where Cv is the value calculated from the operating conditions.

*Innovative products & improvements are our benchmark.*

## DIMENSIONS




| Size (A) | | B | | C | | Pipeline (D) | |
|---|---|---|---|---|---|---|---|
| (in) | (mm) | (in) | (mm) | (in) | (mm) | (in) | (mm) |
| 3 | 80 | 7.0 | 178 | 1.0 | 26 | 4.0 | 100 |
| 4 | 100 | 9.0 | 229 | 1.0 | 26 | 6.0 | 150 |
| 6 | 150 | 11.0 | 280 | 1.0 | 26 | 10.0 | 250 |
| 8 | 200 | 14.0 | 356 | 1.0 | 26 | 12.0 | 300 |
| 10 | 250 | 16.0 | 407 | 1.0 | 26 | 16.0 | 400 |
| 12 | 300 | 18.0 | 458 | 1.0 | 26 | 18.0 | 450 |
| 14 | 350 | 22.0 | 559 | 1.25 | 32 | 20.0 | 500 |
| 16 | 400 | 27.0 | 686 | 1.25 | 32 | 24.0 | 600 |
| 18 | 450 | 33.0 | 839 | 1.75 | 45 | 30.0 | 750 |
| 20 | 500 | 36.0 | 915 | 1.75 | 45 | 30.0 | 750 |
| 24 | 600 | 42.0 | 1067 | 2.00 | 52 | 36.0 | 900 |
| 30 | 750 | 48.0 | 1220 | 2.00 | 52 | 48.0 | 1200 |
| 36 | 900 | 49.0 | 1245 | 2.00 | 52 | 54.0 | 1400 |
| 42 | 1000 | 53.0 | 1347 | 2.00 | 52 | 60.0 | 1500 |
| 48 | 1200 | 60.0 | 1524 | 2.00 | 52 | 72.0 | 1800 |
| 54 | 1400 | 67.0 | 1702 | 2.00 | 52 | 78.0 | 2000 |
| 60 | 1500 | 75.0 | 1905 | 2.00 | 52 | 84.0 | 2100 |