

## PRESSURE DEPENDENT, ON/OFF ACTUATOR

### APPLICABLE PRODUCTS

CCV, HTCCV, ZONE, GLOBE, BALL

### REQUIRED INFORMATION

FOR SIZING:

flow in GPM

ΔP (if none given, utilize 1 psi or line size valve)

FOR SELECTION:

2-way or 3-way valve

pipe size

media temperature

spring return or non-spring return

required close-off pressure (COP)

voltage requirement

ambient temperature

required accessories

### EQUATIONS USED

$$C_v = \frac{Q \cdot \sqrt{G}}{\sqrt{\Delta P}} \quad \Delta P = \left( \frac{Q \cdot \sqrt{G}}{C_v} \right)^2$$

C<sub>v</sub> = required C<sub>v</sub>

Q = flow in Gallons per Minute

G = Specific gravity of fluid (estimated as 1 for water systems)

ΔP = differential pressure over valve (deltaP) – stated in psi

### PROCEDURE

- 1) calculate C<sub>v</sub>
- 2) choose valve type (CCV, Zone, etc)
- 3) choose valve model number that has closest C<sub>v</sub> rating (normally round down unless maximum ΔP for project is exceeded)
  - a. refer to section 6 for CCV (F<sub>p</sub> correction required)
  - b. refer to section 9 for HTCCV
  - c. refer to section 7 for Zone valves
  - d. refer to section 11 for Globe valves
  - e. refer to section 10 for Ball valves (F<sub>p</sub> correction required)
- NOTE: if valve selection requires piping correction factor (F<sub>p</sub>), calculate C<sub>v</sub> based on chart provided in section that shows appropriate C<sub>v</sub> for pipe size selected.
  - in general, do not select a valve less than ½ of the line size
- 4) now calculate actual ΔP based upon C<sub>v</sub> of valve selected
- 5) if calculated ΔP is within project specified limits, proceed with actuator selection
- 6) if #5 is no, need to select a valve with a higher/lower C<sub>v</sub>
- 7) select actuator based upon selection parameters above
- 8) based upon actuator/valve selection, verify close-off pressure (COP) meets project requirements

### EXAMPLE OF CV CALCULATION

i.e GPM is 50

i.e ΔP = 1 psi

C<sub>v</sub> = 50 GPM/sq rt of 1 psi

C<sub>v</sub> = 50 GPM/1 = 50

$$C_v = \frac{50}{\sqrt{1}} = 50$$

## PRESSURE DEPENDENT, PROPORTIONAL ACTUATOR

### APPLICABLE PRODUCTS

CCV, HTCCV, ZONE, GLOBE, BALL

### REQUIRED INFORMATION

FOR SIZING:

flow in GPM

ΔP (if none given, utilize 3-5 psi or match coil pressure drop)

FOR SELECTION:

2-way or 3-way valve

pipe size

media temperature

spring return or non-spring return

required close-off pressure (COP)

voltage requirement

ambient temperature

required accessories

### EQUATIONS USED

$$C_v = \frac{Q \cdot \sqrt{G}}{\sqrt{\Delta P}} \quad \Delta P = \left( \frac{Q \cdot \sqrt{G}}{C_v} \right)^2$$

C<sub>v</sub> = required C<sub>v</sub>

Q = flow in Gallons per Minute

G = Specific gravity of fluid (estimated as 1 for water systems)

ΔP = differential pressure over valve (deltaP) – stated in psi

### PROCEDURE

- 1) calculate C<sub>v</sub>
- 2) choose valve type (CCV, Zone, etc)
- 3) choose valve model number that has closest C<sub>v</sub> rating (normally round down unless maximum ΔP for project is exceeded)
  - a. refer to section 6 for CCV (F<sub>p</sub> correction required)
  - b. refer to section 9 for HTCCV
  - c. refer to section 7 for Zone valves
  - d. refer to section 11 for Globe valves
  - e. refer to section 10 for Ball valves (F<sub>p</sub> correction required)
- NOTE: if valve selection requires piping correction factor (F<sub>p</sub>), calculate C<sub>v</sub> based on chart provided in section that shows appropriate C<sub>v</sub> for pipe size selected.
  - in general, do not select a valve less than ½ of the line size
- 4) now calculate actual ΔP based upon C<sub>v</sub> of valve selected
- 5) if calculated ΔP is within project specified limits, proceed with actuator selection
- 6) if #5 is no, need to select a valve with a higher/lower C<sub>v</sub>
- 7) select actuator based upon selection parameters above
- 8) based upon actuator/valve selection, verify close-off pressure (COP) meets project requirements

### EXAMPLE OF CV CALCULATION

i.e. Pressure drop through the coil is 3 psi, then the pressure drop across the valve should be approximately 3 psi. Let us use 4 psi for example.

i.e. GPM is 50

i.e. ΔP = 4 psi

C<sub>v</sub> = 50 GPM/sq rt of 4 psi

C<sub>v</sub> = 50 GPM/2 = 25

$$C_v = \frac{50}{\sqrt{4}} = 25$$

PRESSURE INDEPENDENT, ON/OFF, FLOATING ACTUATOR

APPLICABLE PRODUCTS

PICCV

REQUIRED INFORMATION

- FOR SIZING:
- flow in GPM
- FOR SELECTION:
- 2-way valves only
  - pipe size
  - media temperature
  - spring return or non-spring return
  - required close-off pressure (COP)
  - voltage requirement
  - ambient temperature
  - required accessories

EQUATIONS USED

No equations are required. Choose the PICCV that has the closest GPM to the requirement and round up to next available flow.

PROCEDURE

- 1) Obtain required GPM
- 2) choose valve model number that has closest GPM rating (round up)
  - refer to section 5 for PICCV
- 3) verify that valve size is not larger than pipe size and in general, do not select a valve less than ½ of the line size
- 4) select actuator based upon selection parameters above
- 5) based upon actuator/valve selection, verify close-off pressure (COP) meets project requirements

EXAMPLE OF CV CALCULATION

87 GPM is needed – choose 90 GPM valve PICCV-50-090

PRESSURE INDEPENDENT, PROPORTIONAL ACTUATOR

APPLICABLE PRODUCTS

PICCV

REQUIRED INFORMATION

- FOR SIZING:
- flow in GPM
- FOR SELECTION:
- 2-way valves only
  - pipe size
  - media temperature
  - spring return or non-spring return
  - required close-off pressure (COP)
  - voltage requirement
  - ambient temperature
  - required accessories

EQUATIONS USED

No equations are required. Choose the PICCV that has the closest GPM to the requirement and round up to next available flow.

PROCEDURE

- 1) Obtain required GPM
- 2) choose valve model number that has closest GPM rating (round up)
  - refer to section 5 for PICCV
- 3) verify that valve size is not larger than pipe size and in general, do not select a valve less than ½ of the line size
- 4) select actuator based upon selection parameters above
- 5) based upon actuator/valve selection, verify close-off pressure (COP) meets project requirements

EXAMPLE OF CV CALCULATION

87 GPM is needed – choose 90 GPM valve PICCV-50-090

### LOW PRESSURE STEAM (15 PSI AND UNDER), ON/OFF ACTUATOR

#### APPLICABLE PRODUCTS

HTCCV, GLOBE, BALL

#### REQUIRED INFORMATION

FOR SIZING:

flow in lb/hr  
 $\Delta P$  (if none given, 10% psi or line size valve)  
 Is it a 1/3 – 2/3 application?

FOR SELECTION:

2-way valve only  
 pipe size  
 media temperature  
 spring return or non-spring return actuation  
 required close-off pressure (COP)  
 voltage requirement  
 ambient temperature  
 required accessories

#### EQUATIONS USED

$$C_v = \frac{Q}{3 \cdot \sqrt{h \cdot P_o}}$$

$C_v$  = Valve coefficient of flow

$Q$  = #/hr steam

$h$  = Pressure drop across open valve  
 – use 10% inlet pressure for on/off applications

$P_o$  = Outlet pressure in psia =  $P_1 - h$

$P_1$  = Absolute inlet pressure = gauge pressure (psig) + 14.7

#### PROCEDURE

- 1) calculate  $C_v$  using 10% inlet gauge pressure as  $h$  (differential pressure)
  - 2) If this is a 1/3 – 2/3 application, you will select 2 valves. The first valve will be rated for 1/3 of the total flow (1/3 of required  $C_v$  rating) and the second valve will be rated for 2/3 of the total flow (2/3 of required  $C_v$  rating).
  - 3) choose valve type (Ball, Globe, HTCCV, etc)
  - 4) choose valve model number that has closest  $C_v$  rating (normally round down unless maximum  $\Delta P$  for project is exceeded)
    - a. refer to section 9 for HTCCV
    - b. refer to section 11 for Globe valves
    - c. refer to section 10 for Ball valves (Fp correction required)
- NOTE: if valve selection requires piping correction factor (Fp), calculate  $C_v$  based on chart provided in section that shows appropriate  $C_v$  for pipe size selected.
- in general, do not select a valve less than ½ of the line size
- 5) now calculate actual  $\Delta P$  based upon  $C_v$  of valve selected
  - 6) if calculated  $\Delta P$  is within project specified limits, proceed with actuator selection
  - 7) if #6 is no, need to select a valve with a higher/lower  $C_v$
  - 8) select actuator based upon selection parameters above
  - 9) based upon actuator/valve selection, verify close-off pressure (COP) meets project requirements

#### EXAMPLE OF $C_v$ CALCULATION

$Q$  = FLOW RATE

$Q$  = 1000 #/hr

Inlet psi = 15 psi

$h$  = 10% (inlet psi)

$h$  = 0.10 (15) = 1.5

$P_o$  = (inlet psi + 14.7) –  $h$

$P_o$  = (15 + 14.7) – 1.5 = 28.2

$C_v$  = 1000/(3\*sqrt[1.5\*28.2])

$C_v$  = 1000/(3\*6.50)

$C_v$  = 1000/19.51

Required  $C_v$  = 51.25

$$C_v = \frac{Q}{3 \cdot \sqrt{h \cdot P_o}} = 51.25$$

LOW PRESSURE STEAM, (15 PSI AND UNDER) PROPORTIONAL ACTUATOR

APPLICABLE PRODUCTS

HTCCV, GLOBE, BALL

REQUIRED INFORMATION

FOR SIZING:
flow in lb/hr
ΔP (if none given, 80% psi of inlet pressure)
Is it a 1/3 – 2/3 application?

FOR SELECTION:
2-way valve only
pipe size
media temperature
spring return or non-spring return actuation
required close-off pressure (COP)
voltage requirement
ambient temperature
required accessories

EQUATIONS USED

Cv = Q / (3 \* sqrt(h \* Po))
Cv = Valve coefficient of flow
Q = #/hr steam
h = Pressure drop across open valve – use 80% of inlet pressure for proportional applications if inlet is under 15 psi
Po = Outlet pressure in psia = P1-h
P1 = Absolute inlet pressure = gauge pressure (psig) + 14.7

PROCEDURE

- 1) calculate Cv using 80% inlet gauge pressure as h (differential pressure)
  - 2) If this is a 1/3 – 2/3 application, you will select 2 valves. The first valve will be rated for 1/3 of the total flow (1/3 of required Cv rating) and the second valve will be rated for 2/3 of the total flow (2/3 of required Cv rating).
  - 3) choose valve type (Ball, Globe, HTCCV, etc)
  - 4) choose valve model number that has closest Cv rating (normally round down unless maximum ΔP for project is exceeded)
a. refer to section 9 for HTCCV
b. refer to section 10 for Globe valves
c. refer to section 11 for Ball valves
- NOTE: if valve selection requires piping correction factor (Fp), calculate Cv based on chart provided in section that shows appropriate Cv for pipe size selected.
- in general, do not select a valve less than ½ of the line size
- 5) now calculate actual ΔP based upon Cv of valve selected
  - 6) if calculated ΔP is within project specified limits, proceed with actuator selection
  - 7) if #6 is no, need to select a valve with a higher/lower Cv
  - 8) select actuator based upon selection parameters above
  - 9) based upon actuator/valve selection, verify close-off pressure (COP) meets project requirements

EXAMPLE OF Cv CALCULATION

Q = FLOW RATE Q = 1000 #/hr
Inlet psi = 15 psi
h = 80% (inlet psi) h = 0.80 (15) = 12
Po = (inlet psi + 14.7) – h Po = (15 + 14.7) – 12 = 17.7
Cv = 1000/(3\*sqrt[12\*17.7])
Cv = 1000/(3\*14.6)
Cv = 1000/43.7
Required Cv = 22.9
Cv = Q / (3 \* sqrt(h \* Po)) = 22.9

### MEDIUM/HIGH PRESSURE STEAM, (ABOVE 15 PSI), ON/OFF ACTUATOR

#### APPLICABLE PRODUCTS

GLOBE, BALL

#### REQUIRED INFORMATION

FOR SIZING:

flow in lb/hr  
 $\Delta P$  (if none given, 10% psi or line size valve)  
 Is it a 1/3 – 2/3 application?

FOR SELECTION:

2-way valve only  
 pipe size  
 media temperature  
 spring return or non-spring return actuation  
 required close-off pressure (COP)  
 voltage requirement  
 ambient temperature  
 required accessories

#### EQUATIONS USED

$$C_v = \frac{Q}{3 \cdot \sqrt{h \cdot P_o}}$$

$C_v$  = Valve coefficient of flow

$Q$  = #/hr steam

$h$  = Pressure drop across open valve  
 – use 10% inlet pressure for on/off applications

$P_o$  = Outlet pressure in psia =  $P_1 - h$

$P_1$  = Absolute inlet pressure = gauge pressure (psig) + 14.7

#### PROCEDURE

- 1) calculate  $C_v$  using 10% inlet pressure as  $h$  (differential pressure)
  - 2) If this is a 1/3 – 2/3 application, you will select 2 valves. The first valve will be rated for 1/3 of the total flow (1/3 of required  $C_v$  rating) and the second valve will be rated for 2/3 of the total flow (2/3 of required  $C_v$  rating).
  - 3) choose valve type (Ball, Globe, HTCCV, etc)
  - 4) choose valve model number that has closest  $C_v$  rating (normally round down unless maximum  $\Delta P$  for project is exceeded)
    - a. refer to section 11 for Globe valves
    - b. refer to section 10 for Ball valves
- NOTE: if valve selection requires piping correction factor ( $F_p$ ), calculate  $C_v$  based on chart provided in section that shows appropriate  $C_v$  for pipe size selected.
- in general, do not select a valve less than 1/2 of the line size
- 5) now calculate actual  $\Delta P$  based upon  $C_v$  of valve selected
  - 6) if calculated  $\Delta P$  is within project specified limits, proceed with actuator selection
  - 7) if #6 is no, need to select a valve with a higher/lower  $C_v$
  - 8) select actuator based upon selection parameters above
  - 9) based upon actuator/valve selection, verify close-off pressure (COP) meets project requirements

#### EXAMPLE OF $C_v$ CALCULATION

$Q$  = FLOW RATE

$Q$  = 1000 #/hr

Inlet psi = 40 psi

$h$  = 10% (inlet psi)

$h$  = 0.10 (40) = 4

$P_o$  = (inlet psi + 14.7) –  $h$

$P_o$  = (40 + 14.7) – 4 = 50.7

$C_v = 1000 / (3 \cdot \sqrt{4 \cdot 50.7})$

$C_v = 1000 / (3 \cdot 14.3)$

$C_v = 1000 / 42.7$

Required  $C_v$  = 23.42

$$C_v = \frac{Q}{3 \cdot \sqrt{h \cdot P_o}} = 23.42$$

MEDIUM/HIGH PRESSURE STEAM, (ABOVE 15 PSI), PROPORTIONAL ACTUATOR

APPLICABLE PRODUCTS

GLOBE, BALL

REQUIRED INFORMATION

FOR SIZING:  
flow in lb/hr  
ΔP (if none given, 42% psi of absolute inlet pressure)  
Is it a 1/3 – 2/3 application?

FOR SELECTION:  
2-way valve only  
pipe size  
media temperature  
spring return or non-spring return actuation  
required close-off pressure (COP)  
voltage requirement  
ambient temperature  
required accessories

EQUATIONS USED

$$C_v = \frac{Q}{3 \cdot \sqrt{h \cdot P_o}}$$
  
 $C_v$  = Valve coefficient of flow  
 $Q$  = #/hr steam  
 $h$  = Pressure drop across open valve – use 42% of absolute inlet pressure for proportional applications  
 $h = 0.42(P_i + 14.7)$   
 $P_o$  = Outlet pressure in psia =  $P_1 - h$   
 $P_1$  = Absolute inlet pressure = gauge pressure (psig) + 14.7

PROCEDURE

- 1) calculate  $C_v$  using 42% absolute inlet pressure as  $h$  (differential pressure)
  - 2) If this is a 1/3 – 2/3 application, you will select 2 valves. The first valve will be rated for 1/3 of the total flow (1/3 of required  $C_v$  rating) and the second valve will be rated for 2/3 of the total flow (2/3 of required  $C_v$  rating).
  - 3) choose valve type (Ball, Globe, HTCCV, etc)
  - 4) choose valve model number that has closest  $C_v$  rating (normally round down unless maximum ΔP for project is exceeded)
    - a. refer to section 11 for Globe valves
    - b. refer to section 10 for Ball valves
- NOTE: if valve selection requires piping correction factor ( $F_p$ ), calculate  $C_v$  based on chart provided in section that shows appropriate  $C_v$  for pipe size selected.
- in general, do not select a valve less than ½ of the line size
- 5) now calculate actual ΔP based upon  $C_v$  of valve selected
  - 6) if calculated ΔP is within project specified limits, proceed with actuator selection
  - 7) if #6 is no, need to select a valve with a higher/lower  $C_v$
  - 8) select actuator based upon selection parameters above
  - 9) based upon actuator/valve selection, verify close-off pressure (COP) meets project requirements

EXAMPLE OF  $C_v$  CALCULATION

$Q$  = FLOW RATE                       $Q$  = 1000 #/hr  
 $P_i$  = inlet psi                           $P_i$  = 40 psi  
 $h$  = pressure drop across open valve – use 42% of absolute inlet pressure for proportional applications  
 $h = 0.42(40 + 14.7) = 22.97$   
 $P_o$  = (outlet pressure in psia + 14.7) –  $h$   
 $P_o = (40 + 14.7) - 22.97 = 31.73$   
 $C_v = 1000 / (3 \cdot \sqrt{22.97 \cdot 31.73})$   
 $C_v = 1000 / (3 \cdot 26.99)$   
 $C_v = 1000 / 80.97$   
Required  $C_v = 12.35$   
$$C_v = \frac{Q}{3 \cdot \sqrt{h \cdot P_o}} = 12.35$$

### PRESSURE DEPENDENT, ON/OFF, ACTUATOR

#### APPLICABLE PRODUCTS

Butterfly Valve HS/HSU Series  
Butterfly Valve High Performance –SHP Series

#### REQUIRED INFORMATION

FOR SIZING:

flow in GPM  
pipe size

FOR SELECTION:

2-way or 3-way valve  
pipe size  
media temperature  
spring return or non-spring return  
required close-off pressure (COP)  
voltage requirement  
ambient temperature  
required accessories

#### EQUATIONS USED

No equations are used. Use Velocity Chart below.

#### PROCEDURE

- 1) To select the proper valve, find required GPM on the chart.
- 2) Choose valve that does not exceed 12 ft/sec for the HS/HSU series or 32 ft/sec for the SHP Series.
- 3) Verify valve selection is not too large or small for the pipe size.
- 4) Verify Close-off Pressure (COP) is sufficient for the application.

#### NOTES

- 1) Most butterfly valves are line size and piping geometry is not considered. If valve size must be reduced, a recommendation is to select a valve only one size less than the pipe. Do not exceed valve type fluid velocity limits.
- 2) For a two-position Butterfly valve, the  $C_v$  is determined at 90° open.
- 3) Determine the close-off rating and choose either a Full Rated (HS) or Undercut (HSU) version. Full rated valves have a close-off rating equivalent to the valve body rating (most are 200 psi), with the exception of 150 psi close-off for the 14" Butterfly valves and above. The Undercut versions have a close-off rating of 50 psi. See Butterfly selection models for the ratings.
- 4) Determine the type of actuation for your application involved.
- 5) Consult Belimo Customer Service for Butterfly applications involving steam, high velocity requirements, etc.

#### EXAMPLE

Application requires a 2-way, 400 GPM Butterfly valve, a valve of 4" minimum would be selected. The 4" valve at 12 ft/second would be able to withstand a capacity of 470 GPM, without damage to the liner.

#### FOR HSU/HSU SERIES

Flow in Std Weight Pipe (Fluid Velocity in GPM). Use with Resilient Seat BF Valves.

SIZE	2 FPS	4 FPS	6 FPS	8 FPS	10 FPS	12 FPS	14 FPS ✕	16 FPS ✕
2"	19	39	59	78	98	117	137	157
2½"	30	61	92	122	153	184	214	245
3"	44	88	132	176	220	264	308	353
4"	78	157	235	313	392	470	548	627
5"	122	245	367	490	612	734	857	979
6"	176	352	529	705	881	1058	1234	1410
8"	313	627	940	1253	1567	1880	2193	2507
10"	490	979	1469	1958	2448	2738	3427	3917
12"	705	1410	2115	2820	3525	4230	4935	5640
14"	959	1919	2879	3838	4798	5758	6717	7677
16"	1253	2507	3760	5013	6267	7520	8774	10027
18"	1586	3173	4759	6345	7931	9518	11104	12690
20"	1958	3917	5875	7834	9792	11750	13709	15668
24"	2820	5640	8460	11280	14100	16921	19741	22561
30"	4406	8813	13220	17625	22032	26438	30845	35251

It is not recommended to exceed 12 feet per second through resilient seat butterfly valves. Velocities greater than 12 fps may damage the valve liner and disc.

#### FOR SHP SERIES

Flow in Std Weight Pipe (Fluid Velocity in GPM). Use with SHP Series BF Valves.

SIZE	4 FPS	8 FPS	12 FPS	16 FPS	20 FPS	24 FPS	28 FPS	32 FPS	36 FPS ✕
2"	39	78	118	157	196	235	274	313	353
2½"	61	122	184	245	306	367	428	490	551
3"	88	176	264	353	441	529	617	705	793
4"	157	313	470	627	783	940	1097	1253	1410
5"	245	490	734	979	1224	1469	1714	1958	2203
6"	352	705	1058	1410	1763	2115	2468	2820	3173
8"	627	1253	1880	2507	3133	3760	4387	5013	5640
10"	979	1958	2938	3917	4896	5875	6854	7834	8813
12"	1410	2820	4230	5640	7050	8460	9870	11280	12690
14"	1919	3838	5738	7677	9596	11515	13435	15354	17273
16"	2507	5013	7520	10027	12534	15040	17547	20054	22561
18"	3173	6345	9518	12690	15863	19036	22208	25381	28553
20"	3917	7834	11750	15667	19584	23501	27418	31334	35251
24"	5640	11280	16921	22561	28201	33841	39481	45121	50762
30"	8813	17625	26438	35251	44064	52877	61689	70502	79315

It is not recommended to exceed 32 feet per second through high performance butterfly valves. Velocities greater than 32 fps may damage the valve.

# Valve Sizing – Water Applications

## Using Velocity Method



### PRESSURE DEPENDENT, PROPORTIONAL ACTUATOR

#### APPLICABLE PRODUCTS

Butterfly Valve HS/HSU Series  
Butterfly Valve High Performance–SHP Series

#### REQUIRED INFORMATION

FOR SIZING:	FOR SELECTION:
flow in GPM	2-way or 3-way valve
pipe size	pipe size
	media temperature
	spring return or non-spring return
	required close-off pressure (COP)
	voltage requirement
	ambient temperature
	required accessories

#### EQUATIONS USED

No equations are used. Use Velocity Chart below.

#### PROCEDURE

- 1) To select the proper valve, find required GPM on the chart.
- 2) Choose valve that does not exceed 12 ft/sec for the HS/HSU series or 32 ft/sec for the SHP Series.
- 3) Verify valve selection is not too large or small for the pipe size.
- 4) Verify Close-off Pressure (COP) is sufficient for the application.

#### NOTES

- 1) Most butterfly valves are line size and piping geometry is not considered. If valve size must be reduced, a recommendation is to select a valve only one size less than the pipe. Do not exceed valve type fluid velocity limits.
- 2) For a modulating Butterfly valve, the  $C_v$  rating is determined at 60° open.
- 3) Determine the close-off rating and choose either a Full Rated (HS) or Undercut (HSU) version. Full rated valves have a close-off rating equivalent to the valve body rating (most are 200 psi), with the exception of 150 psi close-off for the 14" Butterfly valves and above. The Undercut versions have a close-off rating of 50 psi. See Butterfly selection models for the ratings.
- 4) Determine the type of actuation for your application involved.
- 5) Consult Belimo Customer Service for Butterfly applications involving steam, high velocity requirements, etc.

#### EXAMPLE

Application requires a 2-way, 400 GPM Butterfly valve, a valve of 4" minimum would be selected. The 4" valve at 12 ft/second would be able to withstand a capacity of 470 GPM, without damage to the liner.

#### FOR HSU/HSU SERIES

Flow in Std Weight Pipe (Fluid Velocity in GPM). Use with Resilient Seat BF Valves.								
SIZE	2 FPS	4 FPS	6 FPS	8 FPS	10 FPS	12 FPS	14 FPS ✕	16 FPS ✕
2"	19	39	59	78	98	117	137	157
2½"	30	61	92	122	153	184	214	245
3"	44	88	132	176	220	264	308	353
4"	78	157	235	313	392	470	548	627
5"	122	245	367	490	612	734	857	979
6"	176	352	529	705	881	1058	1234	1410
8"	313	627	940	1253	1567	1880	2193	2507
10"	490	979	1469	1958	2448	2738	3427	3917
12"	705	1410	2115	2820	3525	4230	4935	5640
14"	959	1919	2879	3838	4798	5758	6717	7677
16"	1253	2507	3760	5013	6267	7520	8774	10027
18"	1586	3173	4759	6345	7931	9518	11104	12690
20"	1958	3917	5875	7834	9792	11750	13709	15668
24"	2820	5640	8460	11280	14100	16921	19741	22561
30"	4406	8813	13220	17625	22032	26438	30845	35251

It is not recommended to exceed 12 feet per second through resilient seat butterfly valves. Velocities greater than 12 fps may damage the valve liner and disc.

#### FOR SHP SERIES

Flow in Std Weight Pipe (Fluid Velocity in GPM). Use with SHP Series BF Valves.									
SIZE	4 FPS	8 FPS	12 FPS	16 FPS	20 FPS	24 FPS	28 FPS	32 FPS	36 FPS ✕
2"	39	78	118	157	196	235	274	313	353
2½"	61	122	184	245	306	367	428	490	551
3"	88	176	264	353	441	529	617	705	793
4"	157	313	470	627	783	940	1097	1253	1410
5"	245	490	734	979	1224	1469	1714	1958	2203
6"	352	705	1058	1410	1763	2115	2468	2820	3173
8"	627	1253	1880	2507	3133	3760	4387	5013	5640
10"	979	1958	2938	3917	4896	5875	6854	7834	8813
12"	1410	2820	4230	5640	7050	8460	9870	11280	12690
14"	1919	3838	5738	7677	9596	11515	13435	15354	17273
16"	2507	5013	7520	10027	12534	15040	17547	20054	22561
18"	3173	6345	9518	12690	15863	19036	22208	25381	28553
20"	3917	7834	11750	15667	19584	23501	27418	31334	35251
24"	5640	11280	16921	22561	28201	33841	39481	45121	50762
30"	8813	17625	26438	35251	44064	52877	61689	70502	79315

It is not recommended to exceed 32 feet per second through high performance butterfly valves. Velocities greater than 32 fps may damage the valve.



MODELS OF VALVES/APPLICATIONS							
FLOW MEDIUM	PICCV	CCV	HTCCV	BALL	GLOBE	BUTTERFLY	ZONE VALVES
Chilled / Hot Water / Glycol	PICCV-XX-XXX 2-way only	B2(B), B3(B), B6	B2...HT	B2VS, B2VSS B3VS, B6VS	G2, G3(D), G6, G7(D), G6C Series	F6, F7... HS (U) SHP	Z2
3-Way Mixing		B3(B)		B3VS	G3, G7	F7HS (U), SHP	
3-Way Diverting		B3(B)		B3VS	G3D, G7D	F7HS (U), SHP	Z3
Low Pressure Steam (up to 15 inlet psi)			B2...HT	B2VS	G2, G6, G6C	F6 ...SHP	
Medium Pressure Steam (15-50 inlet psi)				B2VS (up to 35 psi only) B2VSS	G2/UGLK up to (35 inlet psi only) G2S/UNV-035, G6, G6C (35 psi only), G6S, G6CS	F6 ...SHP	
High Pressure Steam (50-100 inlet psi)					G2S + UGLK-SS-Kit, G6S, G6CS		
ANSI 250/300					G2, G2S, G3, G3D, G6(S)-250, G7(D)-250	F6, F7... -300SHP	