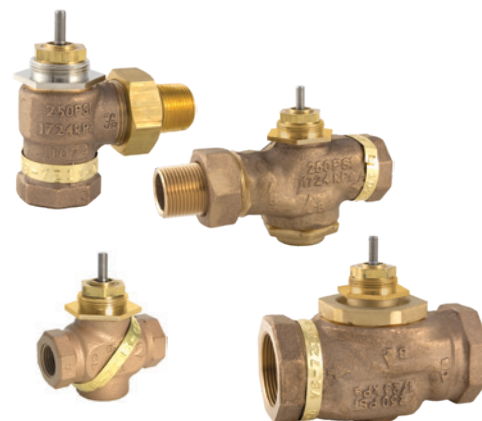


# VB-7200 Two-Way Globe Valve Bodies



## 2-Way and 3-Way Globe Valves

The Venta VB-7200 Series ½"...2" 2-Way globe valves feature the industry's highest performance, most energy efficient control valves for chilled water, hot water and steam applications.

The Venta VB-7300 Series ½"...2" 3-Way globe valves provide efficient control for chilled and hot water applications. Units have a patented precision plug for high rangeability, providing efficient heat transfer over a broad range of HVAC applications.

The Venta seal design provides tight close-off to ensure energy efficiency and provides a high tolerance to high differential pressures.

Venta globe valves are used for two-position, floating or proportional control applications. Valve assemblies may be purchased from the factory or purchased separately, requiring a linked actuator.

Notice: Not for use in combustible gas applications. The VB-7200 series valves are not rated for combustible applications, and if used in these applications, gas leaks and explosions could result.

## Features

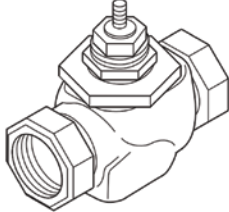
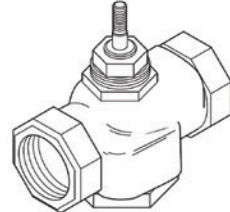
- High rangeability provides fine, accurate control for more efficient, responsive and comfortable regulation.
- Tight sealing with ultra-low energy leakage on shutoff for energy conservation with soft seating.
- High differential-pressure rating of up to 87 psi for reliable operation in demanding applications.
- Very low Cv models (as low as 0.1) for precise control of small and light-load applications.
- Multiple Cv and fitting choices to match loads and piping.
- RoHS compliant product is environmentally friendly and meets ANSI, PED, CRN and other standards.
- Stroke positions are suitable for all Schneider Electric actuators.
- Stem strength exceeds:
  - 600 lb. force on 2-Way and mixing valves
  - 300 lb. force on Diverting valves



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Electric

## Product Selection: Brass Trim Threaded with Soft Seats

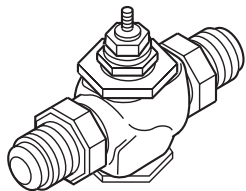
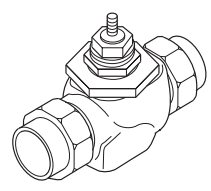
|                                                         |           |            |                                  |                                                                                                                                                            |                                                                                                     |
|---------------------------------------------------------|-----------|------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 2-Way Brass Trim Body Type                              |           |            |                                  | Threaded NPT<br>                                                          | Threaded NPT<br> |
| <b>Series Part Number</b>                               |           |            |                                  | VB-7213-0-4-                                                                                                                                               | VB-7223-0-4-                                                                                        |
| <b>Pipe Sizes</b>                                       |           |            |                                  | 1/2" ... 2"                                                                                                                                                |                                                                                                     |
| <b>Stem Action</b>                                      |           |            |                                  | Up Open                                                                                                                                                    | Up Closed                                                                                           |
| <b>ANSI Pressure Class</b>                              |           |            |                                  | 250 psi (up to 400 psi below 150°F)                                                                                                                        |                                                                                                     |
| <b>ANSI Seat Leakage<sup>b</sup></b>                    |           |            |                                  | Designed to ANSI V with ANSI IV above 35 psi (241 kPa) close off. Long term seat leakage dependent on proper water conditioning maintenance of the system. |                                                                                                     |
| <b>Control Media and Temperature</b>                    |           |            |                                  | 20...281°F (-7 to 138°C) water (up to 60% glycol/water solution), low pressure, saturated, treated steam                                                   |                                                                                                     |
| <b>Flow Curve</b>                                       |           |            |                                  | Modified Equal Percentage                                                                                                                                  |                                                                                                     |
| <b>Allowable ΔP for Water<sup>b</sup></b>               |           |            |                                  | 87 psi (600 kPa) Max. for normal life <sup>a</sup>                                                                                                         |                                                                                                     |
| <b>Max. inlet pressure, saturated steam</b>             |           |            |                                  | 35 psi (240 kPa)                                                                                                                                           |                                                                                                     |
| <b>Max ΔP for sizing, saturated steam<sup>b</sup></b>   |           |            |                                  | 80% of inlet pressure up to 15 psig and 42% of absolute (gage pressure plus 14.7) inlet pressure above 15 psig inlet                                       |                                                                                                     |
| <b>Max ΔP at close-off, saturated steam<sup>b</sup></b> |           |            |                                  | Inlet pressure (35 psi) (actuator must be rated to provide close-off pressure)                                                                             |                                                                                                     |
| <b>Size</b>                                             | <b>Cv</b> | <b>Kvs</b> | <b>Rangeability greater than</b> | <b>Valve Body Part Numbers</b>                                                                                                                             |                                                                                                     |
| 1/2"                                                    | 0.4       | 0.3        | 100:1                            | VB-7213-0-4-01                                                                                                                                             | VB-7223-0-4-01                                                                                      |
|                                                         | 1.3       | 1.1        | 100:1                            | VB-7213-0-4-02                                                                                                                                             | VB-7223-0-4-02                                                                                      |
|                                                         | 2.2       | 1.9        | 100:1                            | VB-7213-0-4-03                                                                                                                                             | VB-7223-0-4-03                                                                                      |
|                                                         | 4.4       | 3.8        | 100:1                            | VB-7213-0-4-04                                                                                                                                             | VB-7223-0-4-04                                                                                      |
| 3/4"                                                    | 5.5       | 4.8        | 100:1                            | VB-7213-0-4-05                                                                                                                                             | VB-7223-0-4-05                                                                                      |
|                                                         | 7.5       | 6.5        | 100:1                            | VB-7213-0-4-06                                                                                                                                             | VB-7223-0-4-06                                                                                      |
| 1"                                                      | 10        | 8.7        | 100:1                            | VB-7213-0-4-07                                                                                                                                             | VB-7223-0-4-07                                                                                      |
|                                                         | 14        | 12.1       | 100:1                            | VB-7213-0-4-08                                                                                                                                             | VB-7223-0-4-08                                                                                      |
| 1 1/4"                                                  | 20        | 17.3       | 100:1                            | VB-7213-0-4-09                                                                                                                                             | VB-7223-0-4-09                                                                                      |
| 1 1/2"                                                  | 28        | 24.2       | 100:1                            | VB-7213-0-4-10                                                                                                                                             | VB-7223-0-4-10                                                                                      |
| 2"                                                      | 40        | 34.6       | 100:1                            | VB-7213-0-4-11                                                                                                                                             | VB-7223-0-4-11                                                                                      |

a To minimize noise, ensure the flow rate in the piping is less than 10 ft (3M) / Second and the differential pressure is less than 35 psi (241 kPa), operating with differential pressures above 35 psi may result in additional noise but is acceptable up to 87 psi (600 kPa). Operating within the cavitation zone may result in noise and internal valve damage.

b Maximum recommended differential pressure in open position. Do not exceed recommended differential pressure (pressure drop), as integrity of parts may be affected.

c Refer to Seat Leakage Classes table.

## Product Selection: Brass Trim Copper Connection with Soft Seats

|                                                   |                                                                                                                       |      |                           |                         |                                                                                                                                                                |                              |                              |  |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------|---------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------|--|
| 2-Way Brass Trim<br>Body Type                     | 5/8" OD 45° SAE Flared                                                                                                |      |                           |                         | Union Sweat                                                                                                                                                    |                              |                              |  |
|                                                   |                                      |      |                           |                         |                                                                             |                              |                              |  |
| Series Part Number                                | VB-7212-0-4-                                                                                                          |      | VB-7222-0-4-              |                         | VB-7214-0-4-                                                                                                                                                   |                              | VB-7224-0-4-                 |  |
| Pipe Sizes                                        | ½" I.D.                                                                                                               |      |                           |                         | ½" ...2"                                                                                                                                                       |                              |                              |  |
| Stem Action                                       | Up Open                                                                                                               |      | Up Closed                 |                         | Up Open                                                                                                                                                        |                              | Up Closed                    |  |
| ANSI Pressure Class                               | 250 psi (up to 400 psi below 150°F)                                                                                   |      |                           |                         |                                                                                                                                                                |                              |                              |  |
| ANSI Seat Leakage <sup>a</sup>                    | ANSI IV                                                                                                               |      |                           |                         | Designed to ANSI V with ANSI IV above 35 psi (241 kPa) close off with long term seat leakage dependent on proper water conditioning maintenance of the system. |                              |                              |  |
| Control Media and Temperature                     | 20...281°F (-7 to 138°C) water (up to 60% glycol/water solution), low pressure, treated steam                         |      |                           |                         |                                                                                                                                                                |                              |                              |  |
| Flow Curve                                        | Modified Equal Percentage                                                                                             |      |                           |                         |                                                                                                                                                                |                              |                              |  |
| Allowable ΔP for Water <sup>b</sup>               | 35 psi (241 kPa) Max. for normal life <sup>a</sup>                                                                    |      |                           |                         | 87 psi (600 kPa) Max. for normal life <sup>a</sup>                                                                                                             |                              |                              |  |
| Max. inlet pressure, saturated steam              | 35 psi (240 kPa)                                                                                                      |      |                           |                         |                                                                                                                                                                |                              |                              |  |
| Max ΔP for sizing, saturated steam <sup>b</sup>   | 80% of inlet pressure up to 15 psig and 42% of absolute (gauge pressure plus 14.7) inlet pressure above 15 psig inlet |      |                           |                         |                                                                                                                                                                |                              |                              |  |
| Max ΔP at close-off, saturated steam <sup>b</sup> | Inlet pressure (actuator must be rated to provide close-off pressure)                                                 |      |                           |                         |                                                                                                                                                                |                              |                              |  |
| Size                                              | Cv                                                                                                                    | Kvs  | Rangeability <sup>c</sup> | Valve Body Part Numbers |                                                                                                                                                                |                              |                              |  |
| ½"                                                | 0.4                                                                                                                   | 0.3  | 5:1                       | VB-7212-0-4-01          | VB-7222-0-4-01                                                                                                                                                 | VB-7214-0-4-01 <sup>c</sup>  | VB-7224-0-4-01 <sup>c</sup>  |  |
|                                                   | 1.3                                                                                                                   | 1.1  | 15:1                      | VB-7212-0-4-02          | VB-7222-0-4-02                                                                                                                                                 | VB-7214-0-4-02 <sup>c</sup>  | VB-7224-0-4-02 <sup>c</sup>  |  |
|                                                   | 2.2                                                                                                                   | 1.9  | 25:1                      | VB-7212-0-4-03          | VB-7222-0-4-03                                                                                                                                                 | VB-7214-0-4-03 <sup>c</sup>  | VB-7224-0-4-03 <sup>c</sup>  |  |
|                                                   | 4.4                                                                                                                   | 3.8  | 40:1                      | VB-7212-0-4-04          | VB-7222-0-4-04                                                                                                                                                 | VB-7214-0-4-04 <sup>c</sup>  | VB-7224-0-4-04 <sup>c</sup>  |  |
| ¾"                                                | 5.5                                                                                                                   | 4.8  | 50:1                      | —                       | —                                                                                                                                                              | VB-7214-0-4-05 <sup>c</sup>  | VB-7224-0-4-05 <sup>c</sup>  |  |
|                                                   | 7.5                                                                                                                   | 6.5  | 60:1                      | —                       | —                                                                                                                                                              | VB-7214-0-4-06 <sup>c</sup>  | VB-7224-0-4-06 <sup>c</sup>  |  |
| 1"                                                | 10                                                                                                                    | 8.7  | 60:1                      | —                       | —                                                                                                                                                              | VB-7214-0-4-07 <sup>cd</sup> | VB-7224-0-4-07 <sup>cd</sup> |  |
|                                                   | 14                                                                                                                    | 12.1 | 60:1                      | —                       | —                                                                                                                                                              | VB-7214-0-4-08 <sup>cd</sup> | VB-7224-0-4-08 <sup>cd</sup> |  |
| 1¼"                                               | 20                                                                                                                    | 17.3 | 75:1                      | —                       | —                                                                                                                                                              | VB-7214-0-4-09 <sup>cd</sup> | VB-7224-0-4-09 <sup>cd</sup> |  |
| 1½"                                               | 28                                                                                                                    | 24.2 | 75:1                      | —                       | —                                                                                                                                                              | VB-7214-0-4-10 <sup>cd</sup> | VB-7224-0-4-10 <sup>cd</sup> |  |
| 2"                                                | 40                                                                                                                    | 34.6 | 75:1                      | —                       | —                                                                                                                                                              | VB-7214-0-4-11 <sup>cd</sup> | VB-7224-0-4-11 <sup>cd</sup> |  |

a,e To minimize noise, ensure the flow rate in the piping is less than 10 ft (3M) / Second and the differential pressure is less than 35 psi (241 kPa), operating with differential pressures above 35 psi may result in additional noise but is acceptable up to 87 psi (600 kPa). Operating within the cavitation zone may result in noise and internal valve damage.

b Maximum recommended differential pressure in open position. Do not exceed recommended differential pressure (pressure drop), as integrity of parts may be affected. Exceeding maximum recommended differential pressure voids product warranty.

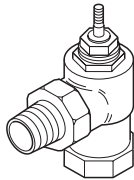
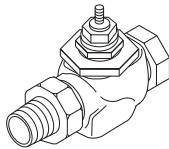
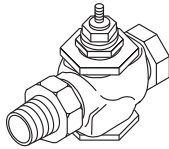
c The VB-7214-0-4- and VB-7224-0-4- 1/2"...2" series valves all have rangeabilities greater than 100:1.

d These part numbers do not have RoHs compliant nuts and tail pieces.

### Seat Leakage Classes

| ANSI/FCI 70-2 Leakage Class | Maximum Seat Leakage                                                   |
|-----------------------------|------------------------------------------------------------------------|
| Class II                    | 0.5% of rated Cv                                                       |
| Class III                   | 0.1% of Rated Cv                                                       |
| Class IV                    | 0.01% of Rated Cv                                                      |
| Class V                     | 0.0005 ml per minute per inch of orifice diameter per psi differential |

## Product Selection: Brass Trim Soft Seat Union for Radiators and Other Applications

| 2-Way Brass Trim Body Type                        |     |      |                                        | Union Angle NPT                                                                                                       | Union Straight NPT                                                                                                                                             | Union Straight NPT                                                                  |
|---------------------------------------------------|-----|------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                   |     |      |                                        |                                      |                                                                              |  |
| Series Part Number                                |     |      |                                        | VB-7211-0-3-                                                                                                          | VB-7211-0-4-                                                                                                                                                   | VB-7221-0-4-                                                                        |
| Pipe Sizes                                        |     |      |                                        | ½" ...1¼"                                                                                                             |                                                                                                                                                                |                                                                                     |
| Stem Action                                       |     |      |                                        | Up Open                                                                                                               | Up Open                                                                                                                                                        | Up Closed                                                                           |
| ANSI Pressure Class                               |     |      |                                        | 250 psi (up to 400 psig below 150°F)                                                                                  |                                                                                                                                                                |                                                                                     |
| ANSI Seat Leakage <sup>a</sup>                    |     |      |                                        | Class IV                                                                                                              | Designed to ANSI V with ANSI IV above 35 psi (241 kPa) close off with long term seat leakage dependent on proper water conditioning maintenance of the system. |                                                                                     |
| Control Media and Temperature                     |     |      |                                        | 20...281°F (-7 to 138°C) water (up to 60% glycol/water solution), low pressure, treated steam                         |                                                                                                                                                                |                                                                                     |
| Flow Curve                                        |     |      |                                        | Modified Equal Percentage                                                                                             |                                                                                                                                                                |                                                                                     |
| Allowable ΔP for Water <sup>b</sup>               |     |      |                                        | 35 psi (241 kPa)<br>Max. for normal life <sup>a</sup>                                                                 | 87 psi (600 kPa) Max. for normal life <sup>d</sup>                                                                                                             |                                                                                     |
| Max inlet pressure for saturated steam            |     |      |                                        | 35 psi (240 kPa)                                                                                                      |                                                                                                                                                                |                                                                                     |
| Max ΔP for sizing, saturated steam <sup>b</sup>   |     |      |                                        | 80% of inlet pressure up to 15 psig and 42% of absolute (gauge pressure plus 14.7) inlet pressure above 15 psig inlet |                                                                                                                                                                |                                                                                     |
| Max ΔP at close-off, saturated steam <sup>b</sup> |     |      |                                        | Inlet pressure (35 psi) (actuator must be rated to provide close-off pressure)                                        |                                                                                                                                                                |                                                                                     |
| Size                                              | Cv  | Kvs  | Rangeability Greater Than <sup>c</sup> | Valve Body Part Numbers                                                                                               |                                                                                                                                                                |                                                                                     |
| ½"                                                | 0.4 | 0.3  | 5:1                                    | VB-7211-0-3-01                                                                                                        | VB-7211-0-4-01 <sup>c</sup>                                                                                                                                    | VB-7221-0-4-01 <sup>c</sup>                                                         |
|                                                   | 1.3 | 1.1  | 15:1                                   | VB-7211-0-3-02                                                                                                        | VB-7211-0-4-02 <sup>c</sup>                                                                                                                                    | VB-7221-0-4-02 <sup>c</sup>                                                         |
|                                                   | 2.2 | 1.9  | 25:1                                   | VB-7211-0-3-03                                                                                                        | VB-7211-0-4-03 <sup>c</sup>                                                                                                                                    | VB-7221-0-4-03 <sup>c</sup>                                                         |
|                                                   | 4.4 | 3.8  | 40:1                                   | —                                                                                                                     | VB-7211-0-4-04 <sup>c</sup>                                                                                                                                    | VB-7221-0-4-04 <sup>c</sup>                                                         |
|                                                   | 5.0 | 4.3  | 40:1                                   | VB-7211-0-3-04                                                                                                        | —                                                                                                                                                              | —                                                                                   |
| ¾"                                                | 5.5 | 4.8  | 50:1                                   | VB-7211-0-3-05                                                                                                        | VB-7211-0-4-05 <sup>c</sup>                                                                                                                                    | VB-7221-0-4-05 <sup>c</sup>                                                         |
|                                                   | 7.5 | 6.5  | 60:1                                   | —                                                                                                                     | VB-7211-0-4-06 <sup>c</sup>                                                                                                                                    | VB-7221-0-4-06 <sup>c</sup>                                                         |
|                                                   | 8.5 | 7.4  | 50:1                                   | VB-7211-0-3-06                                                                                                        | —                                                                                                                                                              | —                                                                                   |
| 1"                                                | 10  | 8.7  | 60:1                                   | —                                                                                                                     | VB-7211-0-4-07 <sup>c</sup>                                                                                                                                    | VB-7221-0-4-07 <sup>c</sup>                                                         |
|                                                   | 14  | 12.1 | 60:1                                   | VB-7211-0-3-07                                                                                                        | VB-7211-0-4-08 <sup>c</sup>                                                                                                                                    | VB-7221-0-4-08 <sup>c</sup>                                                         |
|                                                   | 16  | 13.8 | 75:1                                   | VB-7211-0-3-08                                                                                                        | —                                                                                                                                                              | —                                                                                   |
| 1¼"                                               | 20  | 17.3 | 75:1                                   | —                                                                                                                     | VB-7211-0-4-09 <sup>c</sup>                                                                                                                                    | VB-7221-0-4-09 <sup>c</sup>                                                         |
|                                                   | 22  | 19   | 75:1                                   | VB-7211-0-3-09                                                                                                        | —                                                                                                                                                              | —                                                                                   |

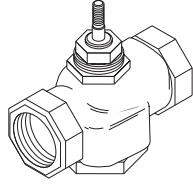
a,d To minimize noise, ensure the flow rate in the piping is less than three meters (10ft)/second and the differential pressure is less than 35 psi (241 kPa). Operating within the cavitation zone or an operating differential pressure above 35 psi (241 kPa) may result in noise and internal valve damage.

b Maximum recommended differential pressure in open position. Do not exceed recommended differential pressure (pressure drop), as integrity of parts may be affected. Exceeding maximum recommended differential pressure voids product warranty.

c The VB-7211-0-4-xx and VB-7221-0-4-xx series valves all have rangeabilities greater than 100:1.

e Refer to Seat Leakage Classes table.

## Product Selection: Stainless Steel Trim Threaded with Soft Seats

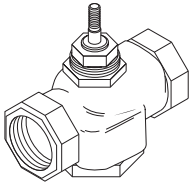
|                                                             |           |            |                                  |                                                                                                                                                            |                     |
|-------------------------------------------------------------|-----------|------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>2-Way Stainless Trim</b><br><b>(Soft Seal) Body Type</b> |           |            |                                  | Threaded NPT<br>                                                        |                     |
| <b>Series Part Number</b>                                   |           |            |                                  | <b>VB-7253-0-4-</b>                                                                                                                                        | <b>VB-7263-0-4-</b> |
| <b>Pipe Sizes</b>                                           |           |            |                                  | 1/2"...2"                                                                                                                                                  | 1/2"...2"           |
| <b>Stem Action</b>                                          |           |            |                                  | Up Open                                                                                                                                                    | Up Closed           |
| <b>ANSI Pressure Class</b>                                  |           |            |                                  | 250 psi (up to 400 psi below 150°F)                                                                                                                        |                     |
| <b>Seat Leakage<sup>c</sup></b>                             |           |            |                                  | Designed to ANSI V with ANSI IV above 35 psi (241 kPa) close off. Long term seat leakage dependent on proper water conditioning maintenance of the system. |                     |
| <b>Control Media and Temperature</b>                        |           |            |                                  | 20...340°F (-7 to 171°C) water (up to 60% glycol/water solution), low pressure, treated steam                                                              |                     |
| <b>Flow Curve</b>                                           |           |            |                                  | Modified Linear                                                                                                                                            |                     |
| <b>Allowable ΔP for Water<sup>b</sup></b>                   |           |            |                                  | 87 psi (600 kPa) Max. for normal life <sup>a</sup>                                                                                                         |                     |
| <b>Max. inlet pressure, saturated steam</b>                 |           |            |                                  | 100 psi (690 kPa)                                                                                                                                          |                     |
| <b>Max ΔP for sizing, saturated steam<sup>b</sup></b>       |           |            |                                  | 80% of inlet pressure up to 15 psig and 42% of absolute (gauge pressure plus 14.7) inlet pressure above 15 psig inlet                                      |                     |
| <b>Max ΔP at close-off, saturated steam<sup>b</sup></b>     |           |            |                                  | Inlet pressure (100 psi) (actuator must be rated to provide close-off pressure)                                                                            |                     |
| <b>Size</b>                                                 | <b>Cv</b> | <b>Kvs</b> | <b>Rangeability Greater Than</b> | <b>Valve Body Part Numbers</b>                                                                                                                             |                     |
| 1/2"                                                        | 0.1       | 0.09       | 13:1                             | -                                                                                                                                                          | VB-7263-0-4-31      |
|                                                             | 0.22      | 0.2        | 18:1                             | -                                                                                                                                                          | VB-7263-0-4-33      |
|                                                             | 0.4       | 0.3        | 100:1                            | VB-7253-0-4-01                                                                                                                                             | VB-7263-0-4-01      |
|                                                             | 0.75      | 0.6        | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-34      |
|                                                             | 1.0       | 0.9        | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-36      |
|                                                             | 1.3       | 1.1        | 100:1                            | VB-7253-0-4-02                                                                                                                                             | VB-7263-0-4-02      |
|                                                             | 1.8       | 1.6        | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-28      |
|                                                             | 2.2       | 1.9        | 100:1                            | VB-7253-0-4-03                                                                                                                                             | VB-7263-0-4-03      |
|                                                             | 2.9       | 2.5        | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-30      |
|                                                             | 3.25      | 2.8        | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-39      |
| 3/4"                                                        | 4.4       | 3.8        | 100:1                            | VB-7253-0-4-04                                                                                                                                             | VB-7263-0-4-04      |
|                                                             | 5.5       | 4.8        | 100:1                            | VB-7253-0-4-05                                                                                                                                             | VB-7263-0-4-05      |
|                                                             | 6.3       | 5.4        | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-41      |
|                                                             | 7.5       | 6.5        | 100:1                            | VB-7253-0-4-06                                                                                                                                             | VB-7263-0-4-06      |
| 1"                                                          | 8.2       | 7.1        | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-51      |
|                                                             | 9.0       | 7.8        | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-52      |
|                                                             | 10        | 8.7        | 100:1                            | VB-7253-0-4-07                                                                                                                                             | VB-7263-0-4-07      |
|                                                             | 12        | 10.4       | 100:1                            | VB-7253-0-4-08                                                                                                                                             | VB-7263-0-4-08      |
| 1 1/4"                                                      | 14        | 12.1       | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-61      |
|                                                             | 16        | 13.8       | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-62      |
|                                                             | 18        | 15.6       | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-63      |
|                                                             | 20        | 17.3       | 100:1                            | VB-7253-0-4-09                                                                                                                                             | VB-7263-0-4-09      |
| 1 1/2"                                                      | 22        | 19.0       | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-71      |
|                                                             | 24        | 20.8       | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-72      |
|                                                             | 28        | 24.2       | 100:1                            | VB-7253-0-4-10                                                                                                                                             | VB-7263-0-4-10      |
| 2"                                                          | 31        | 26.8       | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-81      |
|                                                             | 34        | 29.4       | 100:1                            | -                                                                                                                                                          | VB-7263-0-4-82      |
|                                                             | 40        | 34.6       | 100:1                            | VB-7253-0-4-11                                                                                                                                             | VB-7263-0-4-11      |

a To minimize noise, ensure the flow rate in the piping is less than 10 ft (3M) / Second and the differential pressure is less than 35 psi (241 kPa), operating with differential pressures above 35 psi may result in additional noise but is acceptable up to 87 psi (600 kPa). Operating within the cavitation zone may result in noise and internal valve damage.

b Maximum recommended differential pressure in open position. Do not exceed recommended differential pressure (pressure drop), as integrity of parts may be affected. Exceeding maximum recommended differential pressure voids product warranty.

c Refer to Seat Leakage Classes table.

## Product Selection: Stainless Steel Trim Threaded with Metal to Metal Seats

|                                                   |     |      |              |                                                                                                                       |                |
|---------------------------------------------------|-----|------|--------------|-----------------------------------------------------------------------------------------------------------------------|----------------|
| 2-Way Stainless Trim (Metal to Metal) Body Type   |     |      |              | Threaded NPT<br>                     |                |
| Series Part Number                                |     |      |              | VB-7273-0-4-                                                                                                          | VB-7283-0-4-   |
| Pipe Sizes                                        |     |      |              | 1/2" ... 2"                                                                                                           |                |
| Stem Action                                       |     |      |              | Up Open                                                                                                               | Up Closed      |
| ANSI Pressure Class                               |     |      |              | 250 psi (up to 400 psig below 150°F)                                                                                  |                |
| Seat Leakage <sup>c</sup>                         |     |      |              | ANSI III                                                                                                              |                |
| Control Media and Temperature                     |     |      |              | 20...400°F (-7 to 204°C) water (up to 60% glycol/water solution), low pressure, treated steam                         |                |
| Flow Curve                                        |     |      |              | Modified Linear                                                                                                       |                |
| Allowable ΔP for Water <sup>b</sup>               |     |      |              | 87 psi (600 kPa) Max. for normal life <sup>a</sup>                                                                    |                |
| Max Inlet Pressure, saturated steam               |     |      |              | 150 psi (1034 kPa)                                                                                                    |                |
| Max ΔP for sizing, saturated steam <sup>b</sup>   |     |      |              | 80% of inlet pressure up to 15 psig and 42% of absolute (gauge pressure plus 14.7) inlet pressure above 15 psig inlet |                |
| Max ΔP at close-off, saturated steam <sup>b</sup> |     |      |              | Inlet pressure (150 psi) (actuator must be rated to provide close-off pressure)                                       |                |
| Size                                              | Cv  | Kvs  | Rangeability | Valve Body Part Numbers                                                                                               |                |
| 1/2"                                              | 0.4 | 0.3  | 5:1          | VB-7273-0-4-01                                                                                                        | VB-7283-0-4-01 |
|                                                   | 1.3 | 1.1  | 15:1         | VB-7273-0-4-02                                                                                                        | VB-7283-0-4-02 |
|                                                   | 2.2 | 1.9  | 25:1         | VB-7273-0-4-03                                                                                                        | VB-7283-0-4-03 |
|                                                   | 4.4 | 3.8  | 40:1         | VB-7273-0-4-04                                                                                                        | VB-7283-0-4-04 |
| 3/4"                                              | 5.5 | 4.8  | 50:1         | VB-7273-0-4-05                                                                                                        | VB-7283-0-4-05 |
|                                                   | 7.5 | 6.5  | 60:1         | VB-7273-0-4-06                                                                                                        | VB-7283-0-4-06 |
| 1"                                                | 10  | 8.7  | 60:1         | VB-7273-0-4-07                                                                                                        | VB-7283-0-4-07 |
|                                                   | 12  | 10.4 | 75:1         | VB-7273-0-4-08                                                                                                        | VB-7283-0-4-08 |
| 1 1/4"                                            | 20  | 17.3 | 75:1         | VB-7273-0-4-09                                                                                                        | VB-7283-0-4-09 |
| 1 1/2"                                            | 28  | 24.2 | 75:1         | VB-7273-0-4-10                                                                                                        | VB-7283-0-4-10 |
| 2"                                                | 40  | 34.6 | 75:1         | VB-7273-0-4-11                                                                                                        | VB-7283-0-4-11 |

a To minimize noise, ensure the flow rate in the piping is less than 10 ft (3M) / Second and the differential pressure is less than 35 psi (241 kPa), operating with differential pressures above 35 psi may result in additional noise but is acceptable up to 87 psi (600 kPa). Operating within the cavitation zone may result in noise and internal valve damage.

b Maximum recommended differential pressure in open position. Do not exceed recommended differential pressure (pressure drop), as integrity of parts may be affected. Exceeding maximum recommended differential pressure voids product warranty.

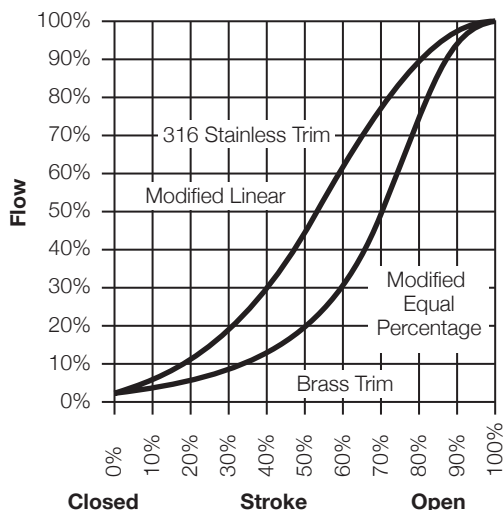
c Refer to Seat Leakage Classes table below.

### Seat Leakage Classes

| ANSI/FCI 70-2 Leakage Class | Maximum Seat Leakage                                                   |
|-----------------------------|------------------------------------------------------------------------|
| Class II                    | 0.5% of rated Cv                                                       |
| Class III                   | 0.1% of Rated Cv                                                       |
| Class IV                    | 0.01% of Rated Cv                                                      |
| Class V                     | 0.0005 ml per minute per inch of orifice diameter per psi differential |

## Flow Characteristics

Two-way valves with brass plugs have modified equal percent-age flow curves and valves with stainless steel plugs have modified linear flow curves. With modified equal percent-age flow curves, for equal increments of valve stem stroke, the change in flow rate with respect to valve stroke may be expressed as a constant percent of the flow rate at the time of the change. The change of flow rate with respect to valve stroke is relatively small when the valve plug is near the valve seat and relatively high when the valve plug is nearly wide open. With modified linear flow curves, the flow is directly proportional to the valve stem position.

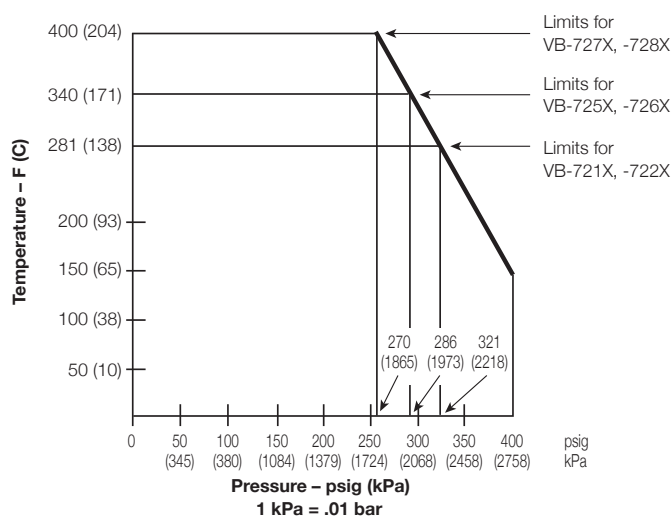


## Temperature Pressure Ratings

Consult the appropriate valve linkage general instruction sheet for the effect of valve body ambient temperatures on specific actuators. Ratings conform with published values and disclaimer.

VB-72xx-0-4-P (Cast Bronze Body)

Standards: Pressure to ANSI B16.15 Class 250 with 400 psig up to 150° F decreasing to 321 psig at 281° F, ASTM B584



Caution: Do not use valves beyond rating of piping system and components. Consult ANSI B16.22 for ratings of solder joint pressure fittings.

## VB-7200 Two-Way Globe Valves Material Specifications

|                      |               |                                                                                                                  |                                                              |                                                            |                                    |                                    |
|----------------------|---------------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------|------------------------------------|------------------------------------|
| VB-7200 Valve Series |               | VB-7211-0-4 (1/2" to 1-1/4"), VB-7213, VB-7221-0-4 (1/2" to 1-1/4"), VB-7223, VB-7214, VB-7224, VB-7215, VB-7225 | VB-7211-0-3 (1/2" to 1-1/4"), VB-7212 (1/2"), VB-7222 (1/2") | VB-7251-0-3 (1/2" to 1-1/4"), VB-7251-0-4 (1/2" to 1-1/4") | VB-7253, VB-7255, VB-7263, VB-7265 | VB-7273, VB-7275, VB-7283, VB-7285 |
| Body                 |               | Bronze, ASTM B584                                                                                                |                                                              |                                                            |                                    |                                    |
| Seat                 |               | Bronze, ASTM B584                                                                                                |                                                              |                                                            | 316 Stainless Steel                |                                    |
| Stem                 |               | 316 Stainless Steel                                                                                              |                                                              |                                                            |                                    |                                    |
| Plug                 |               | Brass                                                                                                            |                                                              | 316 Stainless Steel                                        |                                    |                                    |
| Packing              |               | Spring-Loaded PTFE/EPDM                                                                                          |                                                              |                                                            |                                    |                                    |
| Seal                 | 1/2" and 3/4" | PTFE                                                                                                             | EPDM                                                         | PTFE                                                       |                                    | Metal to Metal 316 Stainless Steel |
|                      | 1" to 2"      | EPDM                                                                                                             |                                                              |                                                            |                                    |                                    |

Packing and Seal materials: Polytetrafluoroethylene (PTFE), ethylene propylene diene monomer (EPDM)

## Valve Sizing and Selection

### Sizing for Water

#### Two-position

Two-position control valves are normally selected “line size” to keep pressure drop at a minimum. If it is desirable to reduce the valve below line size, then 10% of “available pressure” (that is, the pump pressure differential available between supply and return mains with design flow at the valve location) is normally used to select the valve.

#### Proportional and Floating

Proportional and floating control valves are usually selected to take a pressure drop equal to at least 50% of the “available pressure.” As “available pressure” is often difficult to calculate, the normal procedure is to select the valve using a pressure drop at least equal to the drop in the coil or other load being controlled (except where small booster pumps are used) with a minimum recommended pressure drop of 5 psi (34 kPa). When the design temperature drop is less than 60°F (33°C) for conventional heating systems, higher pressure drops across the valve are needed for good results.

Do not exceed the maximum recommended pressure drop of the valve.

### Conventional Heating System

| Design Temperature Load Drop °F (°C) | Recommended Pressure Drop (% of Available Pressure) | Multiplier on Load Drop |
|--------------------------------------|-----------------------------------------------------|-------------------------|
| 60 (33) or more                      | 50%                                                 | 1x Load Drop            |
| 40 (22)                              | 66%                                                 | 2x Load Drop            |
| 20 (11)                              | 75%                                                 | 3x Load Drop            |

Actuator must be rated to provide close off pressure.

Pressure drop is calculated using the following form of the above formula:

$$\Delta P = \left( \frac{m^3/h}{kvs} \right)^2$$

These formulas can be used to calculate one of the three quantities if the other two are known.

### Cv (Flow Coefficient) Determination

The valves' water capacity is based on the following formula:

$$C_v = \frac{GPM}{\sqrt{\Delta P}} \text{ or } C_v = GPM \sqrt{\frac{\text{Specific Gravity}}{\Delta P}}$$

**Where:**  $C_v$  = Coefficient of flow

$C_v$  is defined as the flow in GPM with  $\Delta P = 1$  psi with the valve completely open

GPM = U.S. gallons per minute (60°F, 15.6°C)

$\Delta P$  = Differential pressure in psi (pressure drop)

Other forms of this formula are:

$$\Delta P = \left( \frac{GPM}{C_v} \right)^2$$

and

$$GPM = C_v \sqrt{\Delta P}$$

These formulas can be used to calculate one of the three quantities if the other two are known.

Flow coefficients ( $C_v$ 's) for valve bodies are given on pages 2 to 6.

### Metric (SI) Units

Kvs is defined as the flow in m<sup>3</sup>/h with  $\Delta P = 100$  kPa (1.0 Bar) with the valve completely open.

Flow is calculated using the following formula:

$$m^3/h = kvs \sqrt{\Delta P}$$

**Where:**

$\Delta P$  = Differential pressure (pressure drop) in Bar  
(1 Bar = 100 kPa)

m<sup>3</sup>/h = Cubic metres/hour (15.6 °C)



## Cavitation Limitations on Valve Pressure Drop

A valve selected with too high a pressure drop can cause erosion of seals and/or wire drawing of the seat. In addition, cavitation can cause noise, damage to the valve trim (and possibly the body), and choke the flow.

Do not exceed the maximum differential pressure (pressure drop) for the valve selected.

The following formula can be used on higher temperature water systems, where cavitation could be a problem, to estimate the maximum allowable pressure drop across the valve:

$$P_m = 0.5 (P_1 - P_v)$$

Where:

$P_m$  = Maximum allowable pressure drop (psi)

$P_1$  = Absolute inlet pressure (psia)

$P_v$  = Absolute vapor pressure (psia)

Note: Add 14.7 psi to gauge supply pressure to obtain absolute pressure value. For example, if a valve is controlling 200°F water at an inlet pressure of 18 psig, the maximum pressure drop allowable would be:

$$P_m = 0.5 [(18 + 14.7) - 11.53] = 10.6 \text{ psi}$$

(Vapor pressure of 200°F water is 11.53 psia)

If the pressure drop for this valve is less than 10.6 psi, cavitation should not be a problem. Systems where cavitation is shown to be a problem can sometimes be adjusted to provide higher downstream back pressures. Valves having harder seat materials should be furnished if inlet velocities cannot be lowered.

## Vapor Pressure Of Water Table

| Temp (°F) | Pressure (psia) | Temp. (°F) | Pressure (psia) | Temp. (°F) | Pressure (psia) | Temp. (°F) | Pressure (psia) |
|-----------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 40        | 0.12            | 90         | 0.70            | 140        | 2.89            | 190        | 9.34            |
| 50        | 0.18            | 100        | 0.95            | 150        | 3.72            | 200        | 11.53           |
| 60        | 0.26            | 110        | 1.28            | 160        | 4.74            | 210        | 14.12           |
| 70        | 0.36            | 120        | 1.69            | 170        | 5.99            | 220        | 17.19           |
| 80        | 0.51            | 130        | 2.22            | 180        | 7.51            | 230        | 20.78           |

## Seat Leakage Classes

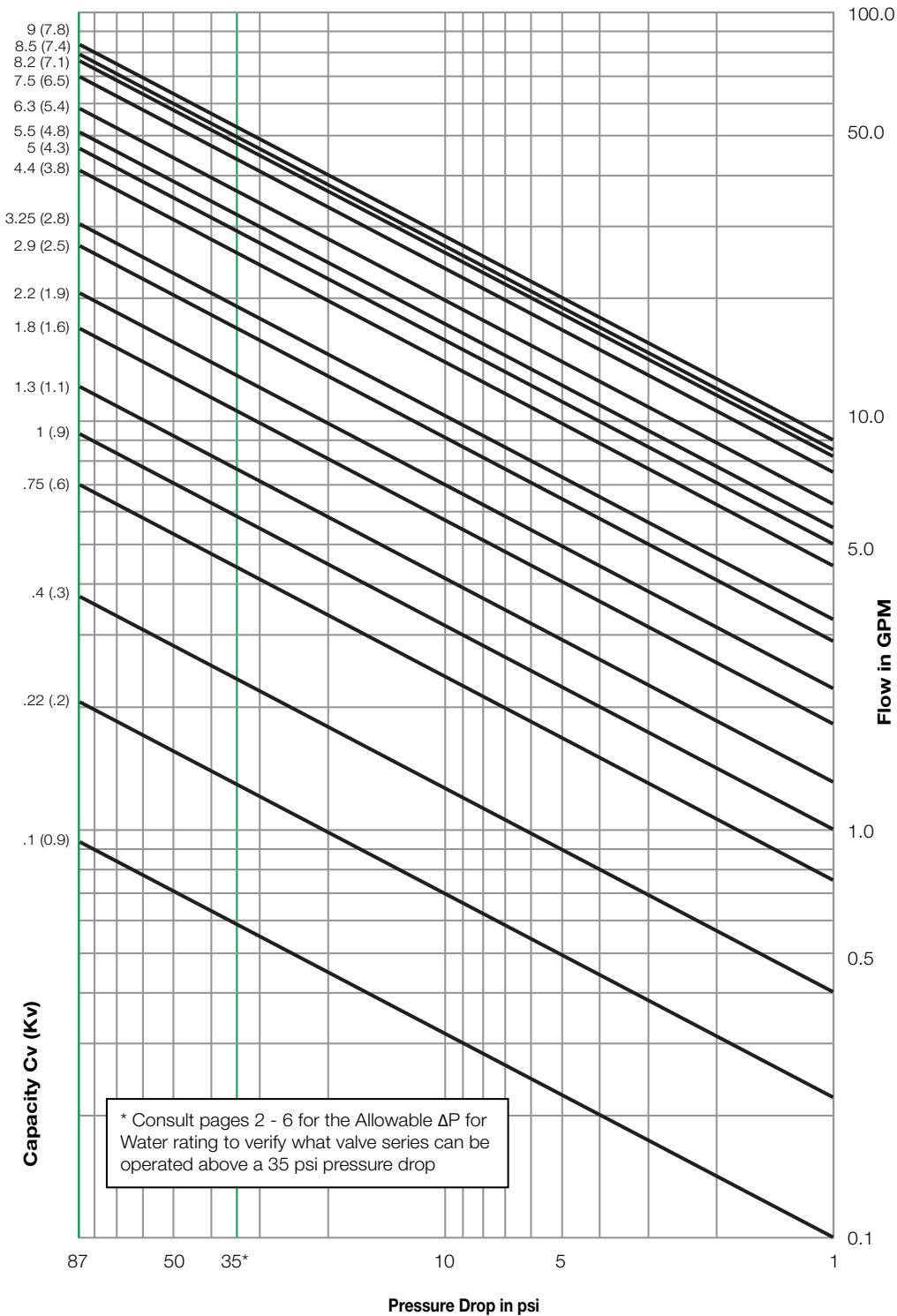
| ANSI/FCI 70-2 Leakage Class | Maximum Seat Leakage                                                   |
|-----------------------------|------------------------------------------------------------------------|
| Class II                    | 0.5% of rated Cv                                                       |
| Class III                   | 0.1% of Rated Cv                                                       |
| Class IV                    | 0.01% of Rated Cv                                                      |
| Class V                     | 0.0005 ml per minute per inch of orifice diameter per psi differential |

## Water Capacity Graph Instructions

To Select the appropriate valve Cv from the Graph:

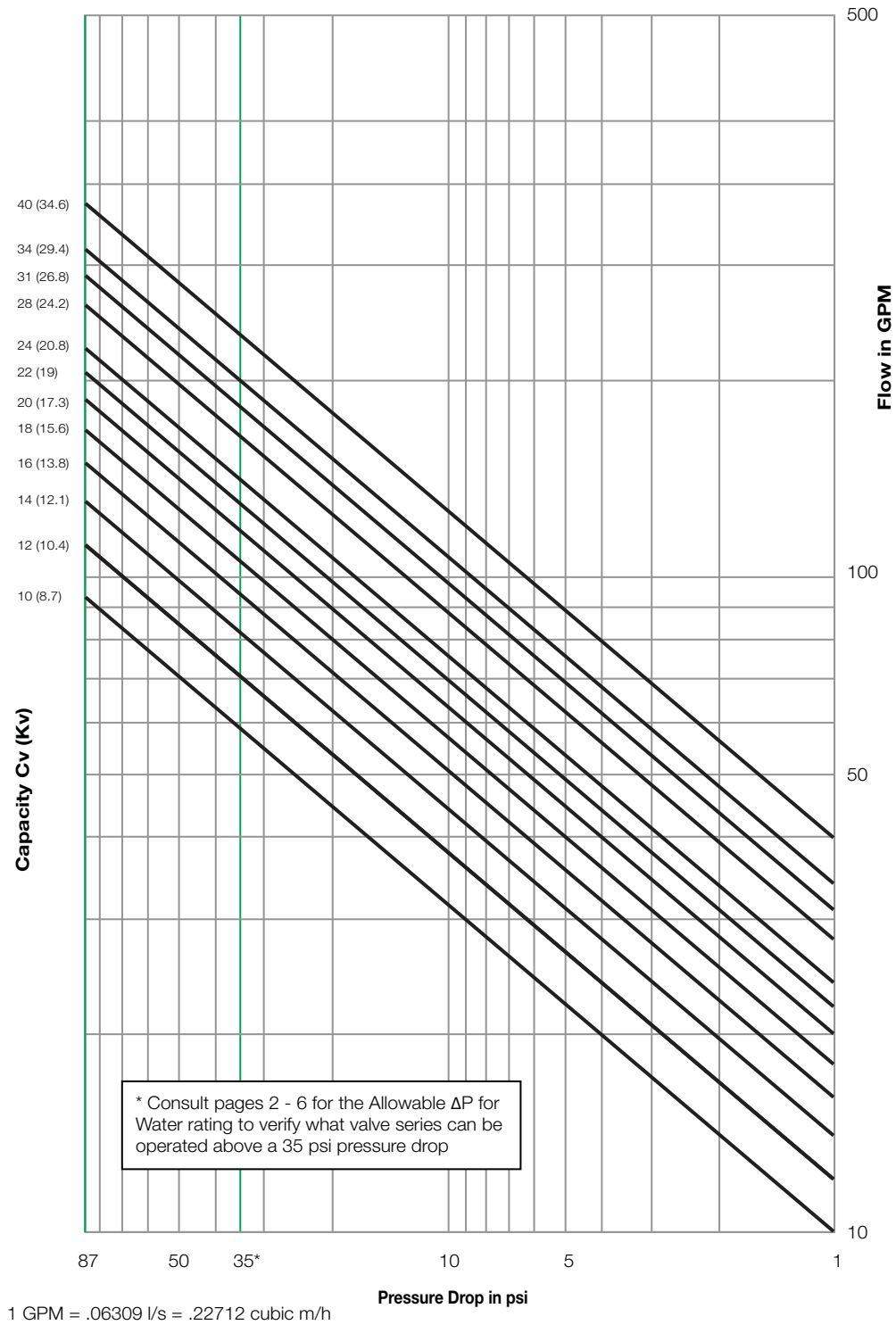
1. Select the required flow from the "Flow in GPM" axis.
2. Select available pressure drop from the "Pressure Drop in psi" axis.
3. Select the appropriate line and follow to the Capacity Cv (Kv) listing to choose the closest valve Cv flow coefficient.
4. Confirm the selection by calculation from the water equations (optional).

## Water Capacity for 0.1 to 9.0 Cv Valves



1 GPM = .06309 l/s = .22712 cubic m/h

# Water Capacity for 10 to 40 Cv Valves



## Sizing for Steam

### Two-position

Two-position zone valves and direct radiation valves are normally sized using a minimum of 10% of inlet pressure (psig).

### Proportional

For low pressure (15 psig or less), use  $\Delta P$  of 80% of gauge inlet pressure.

For steam pressures greater than 15 psig, use  $\Delta P$  of 42% of absolute (gauge plus 14.7 psig) inlet pressure.

Maximum recommended differential pressure in open position. Do not exceed recommended differential pressure (pressure drop), as integrity of parts may be affected. Exceeding maximum recommended differential pressure voids product warranty.

When the  $C_v$  required is between two valve sizes, select the larger size. Do not size steam valves using a pressure drop greater than 42% of the absolute inlet pressure.

Actuator must be rated to provide close off pressure.

Do not exceed the maximum recommended pressure drop of the valve.

## Additional Valve Sizing Information

- For more information:
- CA-28 Control Valve Sizing, F-13755
- Valve Selection Chart Water, F-11080
- Valve Selection Chart Steam, F-11366

Valve / Actuator Selection Guides with Close Off Pressure Ratings:

- Linked Globe Valve Assemblies Selection Guide (Rack) F-26752
- Linked Globe Valve Assemblies Selection Guide (Linear) F-27252
- Forta/Globe Valve Selection Guide F-27490
- Globe Valve Catalog (Pneumatic / Geartrain) F-27414

## Steam Capacity Table Instructions

To Select the appropriate valve  $C_v$  from the Table:

1. Determine if control is two position or proportional and use left column under Differential Pressure for two position control or the right column under inlet pressure for proportional control.
2. Select table column with the available Inlet Pressure to be maintained.
3. Go down to the desired pounds of Steam Per Hour.
4. Select the closest valve  $C_v$  flow coefficient from the left hand column.

## $C_v$ (Flow Coefficient) Determination

The valves' steam capacity is based on the following formula:

$$C_v = \frac{QK}{3\sqrt{\Delta P \times P_2}}$$

**Where:**  $C_v$  = Coefficient of flow

$Q$  = Lbs per hour of steam

$\Delta P$  = Differential pressure in psi (pressure drop)

$P_2$  = Outlet pressure in psia (absolute)  
psig + 14.7 = psia (absolute)

$K$  =  $1 + (0.0007 \times ^\circ\text{F super-heat})$

**Note:**  $K$  normally is 1 ( $K = 1$  for saturated steam).

Other forms of this formula are:

$$Q = \frac{3C_v\sqrt{\Delta P \times P_2}}{K}$$

**Note:**  $K$  normally is 1.

$$\Delta P = \left( \frac{QK}{3C_v} \right)^2 \times \frac{1}{P_2}$$

**Note:**  $K$  normally is 1.

$$P_2 = \left( \frac{QK}{3C_v} \right)^2 \times \frac{1}{\Delta P}$$

**Note:**  $K$  normally is 1 ( $K = 1$  for saturated steam).

These formulas can be used to calculate one of the quantities if the others are known.

Flow coefficients ( $C_v$ 's) for specific valve bodies are given on specification pages of this document.

## Steam Capacity in Pounds per Hour

| Cv   | Kv   | Inlet Pressure (psig) <sup>a</sup>       |       |              |       |               |       |               |       |               |       |               |       |
|------|------|------------------------------------------|-------|--------------|-------|---------------|-------|---------------|-------|---------------|-------|---------------|-------|
|      |      | 2 psig Inlet                             |       | 5 psig Inlet |       | 10 psig Inlet |       | 15 psig Inlet |       | 20 psig Inlet |       | 25 psig Inlet |       |
|      |      | Differential Pressure (psi) <sup>a</sup> |       |              |       |               |       |               |       |               |       |               |       |
|      |      | Two Position                             | Prop. | Two Position | Prop. | Two Position  | Prop. | Two Position  | Prop. | Two Position  | Prop. | Two Position  | Prop. |
|      |      | 0.2                                      | 1.6   | 0.5          | 4     | 1             | 8     | 1.5           | 12    | 2             | 14    | 2.5           | 16    |
| 0.1  | 0.09 | 0.5                                      | 1.5   | 0.9          | 2.4   | 1.5           | 3.5   | 2.0           | 4.4   | 2.4           | 5.1   | 2.9           | 5.8   |
| 0.22 | 0.2  | 1.2                                      | 3.2   | 2.0          | 5.2   | 3.2           | 7.6   | 4.3           | 10    | 5.3           | 11    | 6.4           | 13    |
| 0.4  | 0.3  | 2.2                                      | 5.9   | 3.7          | 9.5   | 5.8           | 14    | 7.8           | 17    | 9.7           | 20    | 12            | 23    |
| 0.75 | 0.6  | 4.1                                      | 11    | 7.0          | 18    | 11            | 26    | 15            | 33    | 18            | 38    | 22            | 44    |
| 1    | 0.9  | 5.4                                      | 15    | 9.3          | 24    | 15            | 35    | 20            | 44    | 24            | 51    | 29            | 58    |
| 1.3  | 1.1  | 7.1                                      | 19    | 12           | 31    | 19            | 45    | 25            | 57    | 32            | 66    | 38            | 76    |
| 1.8  | 1.6  | 10                                       | 27    | 17           | 43    | 26            | 62    | 35            | 79    | 44            | 92    | 52            | 105   |
| 2.2  | 1.9  | 12                                       | 32    | 20           | 52    | 32            | 76    | 43            | 96    | 53            | 112   | 64            | 129   |
| 2.9  | 2.5  | 16                                       | 43    | 27           | 69    | 42            | 101   | 57            | 127   | 70            | 148   | 84            | 169   |
| 3.25 | 2.8  | 18                                       | 48    | 30           | 77    | 47            | 113   | 63            | 142   | 79            | 166   | 94            | 190   |
| 4.4  | 3.8  | 24                                       | 65    | 41           | 105   | 64            | 153   | 86            | 192   | 107           | 225   | 127           | 257   |
| 5    | 4.3  | 27                                       | 74    | 46           | 119   | 73            | 173   | 98            | 219   | 121           | 255   | 145           | 292   |
| 5.5  | 4.8  | 30                                       | 81    | 51           | 131   | 80            | 191   | 107           | 240   | 133           | 281   | 159           | 321   |
| 6.3  | 5.4  | 34                                       | 93    | 59           | 150   | 92            | 218   | 123           | 275   | 153           | 322   | 182           | 368   |
| 7.5  | 6.5  | 41                                       | 111   | 70           | 178   | 110           | 260   | 146           | 328   | 182           | 383   | 217           | 438   |
| 8.2  | 7.1  | 45                                       | 121   | 76           | 195   | 120           | 284   | 160           | 359   | 199           | 419   | 237           | 479   |
| 8.5  | 7.4  | 46                                       | 125   | 79           | 202   | 124           | 295   | 166           | 372   | 206           | 434   | 246           | 497   |
| 9    | 7.8  | 49                                       | 133   | 84           | 214   | 131           | 312   | 176           | 393   | 218           | 460   | 260           | 526   |
| 10   | 8.7  | 54                                       | 147   | 93           | 238   | 146           | 347   | 195           | 437   | 243           | 511   | 289           | 584   |
| 12   | 10.4 | 65                                       | 177   | 112          | 285   | 175           | 416   | 234           | 525   | 291           | 613   | 347           | 701   |
| 14   | 12.1 | 76                                       | 206   | 130          | 333   | 204           | 485   | 273           | 612   | 340           | 715   | 405           | 818   |
| 16   | 13.8 | 87                                       | 236   | 149          | 380   | 234           | 555   | 312           | 700   | 388           | 817   | 463           | 935   |
| 18   | 15.6 | 98                                       | 265   | 167          | 428   | 263           | 624   | 351           | 787   | 437           | 919   | 521           | 1052  |
| 20   | 17.3 | 109                                      | 295   | 186          | 475   | 292           | 694   | 390           | 874   | 485           | 1021  | 579           | 1168  |
| 22   | 19   | 120                                      | 324   | 204          | 523   | 321           | 763   | 429           | 962   | 534           | 1124  | 636           | 1285  |
| 24   | 20.8 | 131                                      | 354   | 223          | 571   | 351           | 832   | 468           | 1049  | 582           | 1226  | 694           | 1402  |
| 28   | 24.2 | 153                                      | 413   | 260          | 666   | 409           | 971   | 546           | 1224  | 679           | 1430  | 810           | 1636  |
| 31   | 26.8 | 169                                      | 457   | 288          | 737   | 453           | 1075  | 605           | 1355  | 752           | 1583  | 897           | 1811  |
| 34   | 29.4 | 185                                      | 501   | 316          | 808   | 497           | 1179  | 663           | 1487  | 825           | 1736  | 984           | 1986  |
| 40   | 34.6 | 218                                      | 590   | 372          | 951   | 584           | 1387  | 780           | 1749  | 970           | 2043  | 1157          | 2337  |

a. Values are for saturated steam (K = 1). Left column under each inlet pressure is for two position control, and right column is for proportional control.

Always select the correct valve series for the inlet steam pressure as shown below:

| Valve Series                                                                                                                                                                         | Max Inlet Pressure for Saturated Steam | Maximum Media Temperature |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------|
| VB-7273-0-4-, VB-7283-0-4-, VB-7275-0-4-, VB-7285-0-4-                                                                                                                               | 150 psi (1034 kPa)                     | 20 to 400°F (-7 to 204°C) |
| VB-7253-0-4-, VB-7263-0-4-, VB-7255-0-4-, VB-7265-0-4-                                                                                                                               | 100 psi (690 kPa)                      | 20 to 340°F (-7 to 171°C) |
| VB-7213-0-4-, VB-7223-0-4-, VB-7215-0-4-, VB-7225-0-4-, VB-7212-0-4-, VB-7222-0-4-, VB-7214-0-4-, VB-7224-0-4-, VB-7211-0-3-, VB-7211-0-4-, VB-7221-0-4-, VB-7251-0-3-, VB-7211-0-4- | 35 psi (240 kPa)                       | 20 to 281°F (-7 to 138°C) |

1 Pound per Hour = 0.45359 Kilogram Per Hour

## Steam Capacity in Pounds per Hour (continued)

| Cv   | Kv   | Inlet Pressure (psig) <sup>a</sup>       |       |               |       |               |       |               |       |               |       |                |       |
|------|------|------------------------------------------|-------|---------------|-------|---------------|-------|---------------|-------|---------------|-------|----------------|-------|
|      |      | 30 psig Inlet                            |       | 35 psig Inlet |       | 40 psig Inlet |       | 50 psig Inlet |       | 75 psig Inlet |       | 100 psig Inlet |       |
|      |      | Differential Pressure (psi) <sup>a</sup> |       |               |       |               |       |               |       |               |       |                |       |
|      |      | Two Position                             | Prop. | Two Position  | Prop. | Two Position  | Prop. | Two Position  | Prop. | Two Position  | Prop. | Two Position   | Prop. |
|      |      | 3                                        | 18    | 3.5           | 20    | 4             | 22    | 5             | 27    | 7.5           | 37    | 10             | 48    |
| 0.1  | 0.09 | 3.4                                      | 6.6   | 3.8           | 7.3   | 4.3           | 8.0   | 5.2           | 9.6   | 7.4           | 13    | 9.7            | 17    |
| 0.22 | 0.2  | 7.4                                      | 14    | 8.4           | 16    | 9.4           | 18    | 11            | 21    | 16            | 29    | 21             | 37    |
| 0.4  | 0.3  | 13                                       | 26    | 15            | 29    | 17            | 32    | 21            | 38    | 30            | 53    | 39             | 68    |
| 0.75 | 0.6  | 25                                       | 49    | 29            | 55    | 32            | 60    | 39            | 72    | 56            | 99    | 73             | 127   |
| 1    | 0.9  | 34                                       | 66    | 38            | 73    | 43            | 80    | 52            | 96    | 74            | 132   | 97             | 170   |
| 1.3  | 1.1  | 44                                       | 85    | 50            | 95    | 56            | 105   | 67            | 124   | 97            | 172   | 126            | 221   |
| 1.8  | 1.6  | 60                                       | 118   | 69            | 132   | 77            | 145   | 93            | 172   | 134           | 238   | 175            | 306   |
| 2.2  | 1.9  | 74                                       | 145   | 84            | 161   | 94            | 177   | 114           | 211   | 164           | 291   | 214            | 373   |
| 2.9  | 2.5  | 97                                       | 191   | 111           | 212   | 124           | 233   | 150           | 278   | 216           | 384   | 282            | 492   |
| 3.25 | 2.8  | 109                                      | 214   | 124           | 238   | 139           | 262   | 168           | 311   | 242           | 431   | 315            | 552   |
| 4.4  | 3.8  | 148                                      | 289   | 168           | 322   | 188           | 354   | 228           | 421   | 328           | 583   | 427            | 747   |
| 5    | 4.3  | 168                                      | 329   | 191           | 366   | 214           | 402   | 259           | 479   | 372           | 662   | 485            | 849   |
| 5.5  | 4.8  | 185                                      | 362   | 210           | 402   | 235           | 443   | 285           | 526   | 410           | 729   | 534            | 934   |
| 6.3  | 5.4  | 211                                      | 414   | 240           | 461   | 269           | 507   | 327           | 603   | 469           | 835   | 612            | 1069  |
| 7.5  | 6.5  | 252                                      | 493   | 286           | 548   | 320           | 603   | 389           | 718   | 559           | 994   | 728            | 1273  |
| 8.2  | 7.1  | 275                                      | 539   | 313           | 600   | 350           | 660   | 425           | 785   | 611           | 1086  | 796            | 1392  |
| 8.5  | 7.4  | 285                                      | 559   | 324           | 621   | 363           | 684   | 441           | 814   | 633           | 1126  | 825            | 1443  |
| 9    | 7.8  | 302                                      | 592   | 343           | 658   | 385           | 724   | 466           | 861   | 670           | 1192  | 874            | 1528  |
| 10   | 8.7  | 336                                      | 658   | 381           | 731   | 427           | 805   | 518           | 957   | 745           | 1325  | 971            | 1697  |
| 12   | 10.4 | 403                                      | 789   | 458           | 877   | 513           | 966   | 622           | 1149  | 894           | 1590  | 1165           | 2037  |
| 14   | 12.1 | 470                                      | 921   | 534           | 1024  | 598           | 1127  | 726           | 1340  | 1043          | 1855  | 1359           | 2376  |
| 16   | 13.8 | 537                                      | 1052  | 610           | 1170  | 684           | 1287  | 829           | 1531  | 1192          | 2120  | 1553           | 2716  |
| 18   | 15.6 | 604                                      | 1184  | 687           | 1316  | 769           | 1448  | 933           | 1723  | 1341          | 2385  | 1747           | 3055  |
| 20   | 17.3 | 671                                      | 1315  | 763           | 1462  | 854           | 1609  | 1037          | 1914  | 1490          | 2649  | 1941           | 3395  |
| 22   | 19   | 738                                      | 1447  | 839           | 1609  | 940           | 1770  | 1140          | 2106  | 1639          | 2914  | 2136           | 3734  |
| 24   | 20.8 | 805                                      | 1578  | 916           | 1755  | 1025          | 1931  | 1244          | 2297  | 1788          | 3179  | 2330           | 4074  |
| 28   | 24.2 | 940                                      | 1841  | 1068          | 2047  | 1196          | 2253  | 1451          | 2680  | 2086          | 3709  | 2718           | 4753  |
| 31   | 26.8 | 1040                                     | 2039  | 1183          | 2267  | 1324          | 2494  | 1607          | 2967  | 2309          | 4107  | 3009           | 5262  |
| 34   | 29.4 | 1141                                     | 2236  | 1297          | 2486  | 1453          | 2736  | 1762          | 3254  | 2533          | 4504  | 3300           | 5771  |
| 40   | 34.6 | 1342                                     | 2631  | 1526          | 2925  | 1709          | 3219  | 2073          | 3829  | 2980          | 5299  | 3883           | 6790  |

a. Values are for saturated steam (K = 1). Left column under each inlet pressure is for two position control, and right column is for proportional control.

Always select the correct valve series for the inlet steam pressure as shown below:

| Valve Series                                                                                                                                                                         | Max Inlet Pressure for Saturated Steam | Maximum Media Temperature |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------|
| VB-7273-0-4-, VB-7283-0-4-, VB-7275-0-4-, VB-7285-0-4-                                                                                                                               | 150 psi (1034 kPa)                     | 20 to 400°F (-7 to 204°C) |
| VB-7253-0-4-, VB-7263-0-4-, VB-7255-0-4-, VB-7265-0-4-                                                                                                                               | 100 psi (690 kPa)                      | 20 to 340°F (-7 to 171°C) |
| VB-7213-0-4-, VB-7223-0-4-, VB-7215-0-4-, VB-7225-0-4-, VB-7212-0-4-, VB-7222-0-4-, VB-7214-0-4-, VB-7224-0-4-, VB-7211-0-3-, VB-7211-0-4-, VB-7221-0-4-, VB-7251-0-3-, VB-7211-0-4- | 35 psi (240 kPa)                       | 20 to 281°F (-7 to 138°C) |

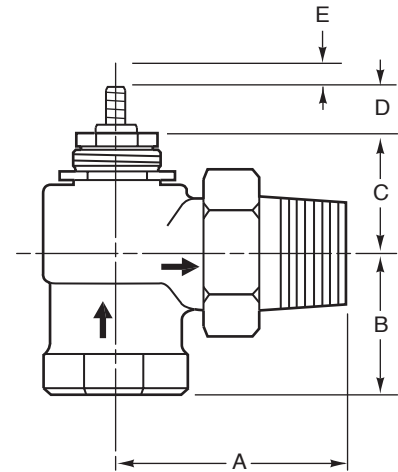
1 Pound per Hour = 0.45359 Kilogram Per Hour

## Dimensions for Stem Up Open Valves

### Union Angle: VB-7211-0-3-P, VB-7251-0-3-P

| Valve Port Code (P) | Valve Size | Dimensions in Inches (mm) |              |             |          |           |
|---------------------|------------|---------------------------|--------------|-------------|----------|-----------|
|                     |            | A                         | B            | C           | D*       | E Stroke  |
| 01, 02, 03, 04      | 1/2"       | 3-1/8 (79)                | 1-5/8 (41)   | 1-5/16 (33) | 3/4 (19) | 7-16 (11) |
| 05, 06              | 3/4"       | 3-5/8 (92)                | 1-11/16 (43) | 1-1/2 (38)  |          |           |
| 07, 08              | 1"         | 4-1/16 (103)              | 1-15/16 (49) | 2-1/8 (54)  |          |           |
| 09                  | 1-1/4"     | 4-5/16 (110)              | 2-3/16 (56)  | 2-1/4 (57)  |          |           |

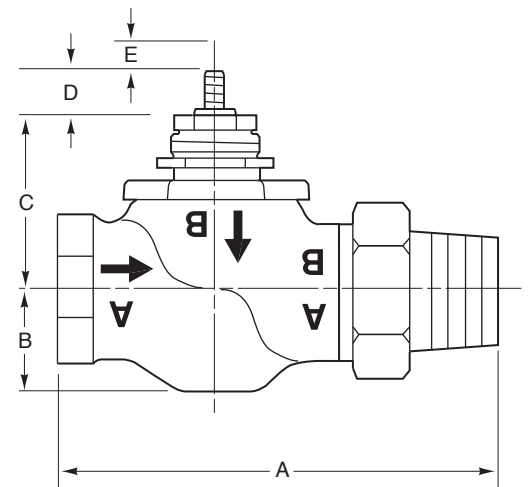
\* Stem down



### Union Straightway: VB-7211-0-4-P, VB-7251-0-4-P

| Valve Port Code (P) | Valve Size | Dimensions in Inches (mm) |            |              |          |           |
|---------------------|------------|---------------------------|------------|--------------|----------|-----------|
|                     |            | A                         | B          | C            | D*       | E Stroke  |
| 01, 02, 03, 04      | 1/2"       | 4-3/16 (106)              | 1-1/4 (32) | 1-11/16 (43) | 3/4 (19) | 7/16 (11) |
| 05, 06              | 3/4"       | 4-15/16 (125)             |            | 2-3/8 (60)   |          |           |
| 07, 08              | 1"         | 6 (152)                   |            |              |          |           |
| 09                  | 1-1/4"     | 6-1/4 (159)               | 1-3/8 (35) |              |          |           |

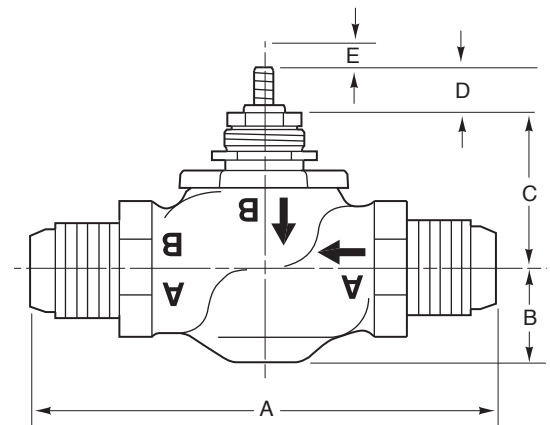
\* Stem down



### SAE Flare: VB-7212-0-4-P

| Valve Port Code (P) | Valve Size | Dimensions in Inches (mm) |            |              |          |           |
|---------------------|------------|---------------------------|------------|--------------|----------|-----------|
|                     |            | A                         | B          | C            | D*       | E Stroke  |
| 01, 02, 03, 04      | 1/2"       | 4 (102)                   | 1-1/4 (32) | 1-11/16 (43) | 3/4 (19) | 7/16 (11) |

\* Stem down

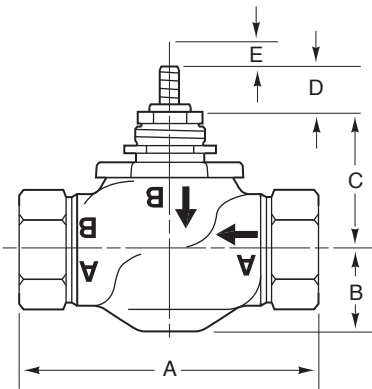


Dimensions for Stem Up Open Valves

Threaded NPT and Rp: VB-7213-0-4-P, VB-7215-0-4-P

| Valve Port Code<br>(P) | Valve<br>Size | Dimensions in Inches (mm) |             |              |             |              |
|------------------------|---------------|---------------------------|-------------|--------------|-------------|--------------|
|                        |               | A                         | B           | C            | D*          | E<br>Stroke  |
| 01, 02, 03, 04         | 1/2"          | 3-1/16 (78)               | 1-1/4 (32)  | 1-11/16 (43) | 3/4<br>(19) | 7-16<br>(11) |
| 05, 06                 | 3/4"          | 3-5/8 (92)                |             | 2-3/8 (60)   |             |              |
| 07, 08                 | 1"            | 4-5/8 (118)               | 1-3/8 (35)  |              |             |              |
| 09                     | 1-1/4"        | 5-3/8 (137)               | 2-7/16 (57) |              |             |              |
| 10                     | 1-1/2"        |                           | 2-3/4 (70)  |              |             |              |
| 11                     | 2"            | 6-1/8 (156)               | 1-5/8 (41)  |              |             |              |

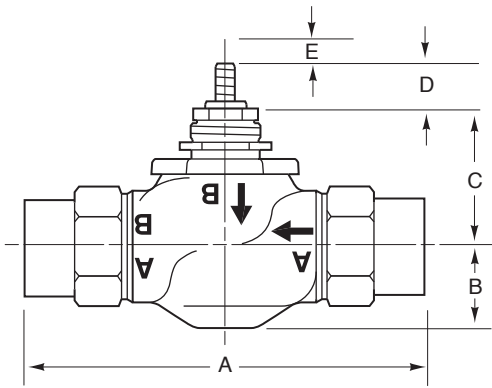
\* Stem down



Union Sweat: VB-7214-4-P

| Valve Port Code (P) | Valve Size | Dimensions in Inches (mm) |            |              |          |           |
|---------------------|------------|---------------------------|------------|--------------|----------|-----------|
|                     |            | A                         | B          | C            | D*       | E Stroke  |
| 01, 02, 03, 04      | 1/2"       | 4-3/16 (106)              | 1-1/4 (32) | 1-11/16 (43) | 3/4 (19) | 7-16 (11) |
| 05, 06              | 3/4"       | 5-7/16 (138)              |            | 1-3/4 (45)   |          |           |
| 07, 08              | 1"         | 6-5/8 (168)               |            |              |          |           |
| 09                  | 1-1/4"     | 6-13/16 (173)             | 1-3/8 (35) | 2 (51)       |          |           |
| 10                  | 1-1/2"     | 8-5/16 (211)              | 1-1/2 (38) | 2-1/8 (54)   |          |           |
| 11                  | 2"         | 9-3/16 (233)              | 1-5/8 (41) | 2-3/16 (56)  |          |           |

\* Stem down



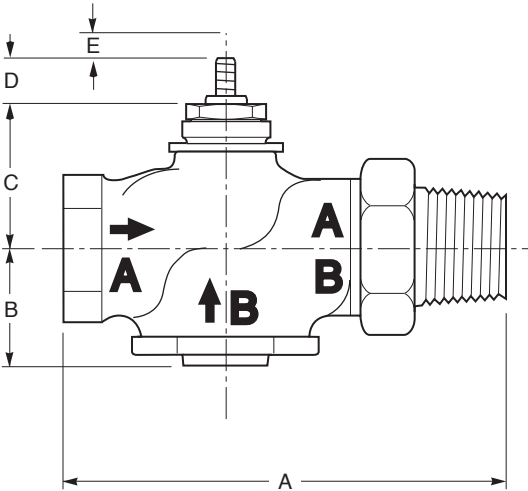


Dimensions for Stem Up Closed Valves

Union Straightway: VB-7221-0-4-P

| Valve Port Code (P) | Valve Size | Dimensions in Inches (mm) |            |              |          |           |
|---------------------|------------|---------------------------|------------|--------------|----------|-----------|
|                     |            | A                         | B          | C            | D*       | E Stroke  |
| 01, 02, 03, 04      | 1/2"       | 4-3/16 (106)              | 1-1/4 (32) | 1-11/16 (43) | 3/4 (19) | 7/16 (11) |
| 05, 06              | 3/4"       | 4-15/16 (125)             |            | 1-3/4 (45)   |          |           |
| 07, 08              | 1"         | 6 (152)                   | 1-3/4 (45) | 1-3/4 (45)   |          |           |
| 09                  | 1-1/4"     | 6-1/4 (159)               |            | 2 (51)       |          |           |

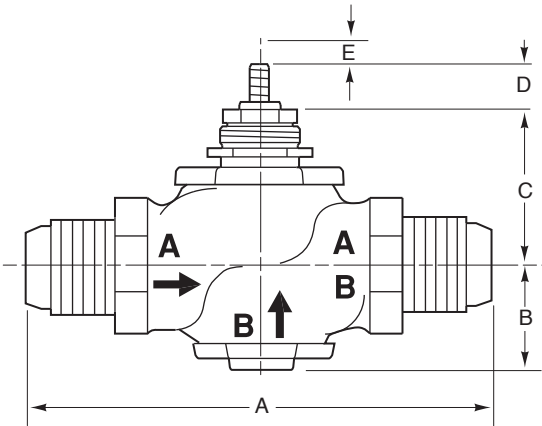
\* Stem down



SAE Flare: VB-7222-0-4-P

| Valve Port Code (P) | Valve Size | Dimensions in Inches (mm) |            |              |          |           |
|---------------------|------------|---------------------------|------------|--------------|----------|-----------|
|                     |            | A                         | B          | C            | D*       | E Stroke  |
| 01, 02, 03, 04      | 1/2"       | 4 (102)                   | 1-1/4 (32) | 1-11/16 (43) | 3/4 (19) | 7/16 (11) |

\* Stem down



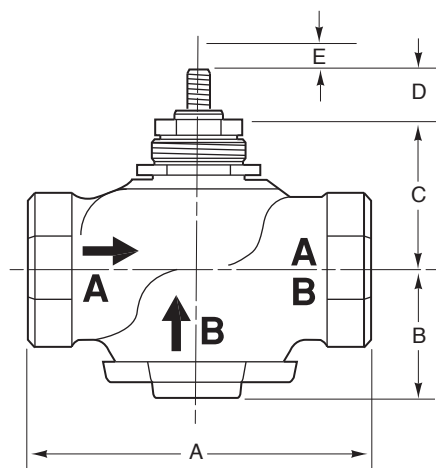
## Dimensions for Stem Up Closed and Stem Up Open Valves

Threaded NPT VB-7223-0-4-P, VB-7253-0-4-P, VB-7263-0-4-P, VB-7273-0-4-P, VB-7283-0-4-P

| Valve Port Code (P)                        | Valve Size | Dimensions in Inches (mm) |              |              |          |           |
|--------------------------------------------|------------|---------------------------|--------------|--------------|----------|-----------|
|                                            |            | A                         | B            | C            | D*       | E Stroke  |
| 01, 02, 03, 04, 28, 30, 31, 33, 34, 36, 39 | 1/2"       | 3-1/16 (78)               | 1-1/4 (32)   | 1-11/16 (43) | 3/4 (19) | 7/16 (11) |
| 05, 06, 41                                 | 3/4"       | 3-5/8 (92)                |              |              |          |           |
| 07, 08, 51, 52                             | 1"         | 4-5/8 (118)               | 1-3/4 (45)   | 1-3/4 (45)   |          |           |
| 09, 61, 62, 63                             | 1-1/4"     |                           |              | 2 (51)       |          |           |
| 10, 71, 72                                 | 1-1/2"     | 5-3/8 (137)               | 1-13/16 (46) | 2-1/8 (54)   |          |           |
| 11, 81, 82                                 | 2"         | 6-1/8 (156)               | 2-1/16 (53)  | 2-3/16 (56)  |          |           |

\* Stem down

All valve port codes are not available on all valve series

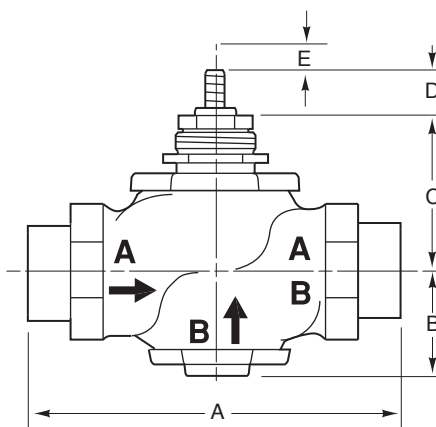


Note - VB-7253-0-4-P, VB-7273-0-4-P up normally open valves have inverted A, B, and AB port embossings

## Union Sweat: VB-7224-0-4-P

| Valve Port Code (P) | Valve Size | Dimensions in Inches (mm) |             |              |          |           |
|---------------------|------------|---------------------------|-------------|--------------|----------|-----------|
|                     |            | A                         | B           | C            | D*       | E Stroke  |
| 01, 02, 03, 04      | 1/2"       | 4-3/16 (106)              | 1-1/4 (32)  | 1-11/16 (43) | 3/4 (19) | 7/16 (11) |
| 05, 06              | 3/4"       | 5-7/16 (138)              |             |              |          |           |
| 07, 08              | 1"         | 6-5/8 (168)               | 1-3/4 (45)  | 1-3/4 (45)   |          |           |
| 09                  | 1-1/4"     | 6-13/16 (173)             |             | 2 (51)       |          |           |
| 10                  | 1-1/2"     | 8-5/16 (211)              |             | 2-1/8 (54)   |          |           |
| 11                  | 2"         | 9-3/16 (233)              | 2-1/16 (53) | 2-3/16 (56)  |          |           |

\* Stem down



## Stem and Bonnet Nut Thread Information for All VB-7000 Valve Series

Valve Stem Threads: 1/4"-28 UNF-2A Thread

Bonnet Nut Threads: 1-1/4" -16 Thread

Bonnet Nut Outer Hex Size: 1-5/8" (use 1-5/8" Open End Wrench or equivalent)