



— MODEL —

# 100-22

## 600 Series

# Powercheck Valve



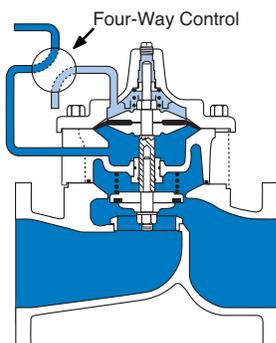
- Built-in Automatic Check Valve
- Reduced Cavitation Design
- Service Without Removal From Line
- Packless Construction
- Drip-Tight and Positive Seating

The Cla-Val Model 100-22 Powercheck Valve is a hydraulically operated diaphragm valve with a built-in check feature to prevent return flow. Available in globe or angle pattern, it consists of four major components: the body, intermediate chamber, diaphragm assembly and cover. The diaphragm assembly is the only moving part.

The diaphragm assembly which is guided top, center and bottom by a precision machined stem utilizes an FDA approved non-wicking diaphragm of nylon fabric bonded with synthetic rubber. A synthetic rubber disc retained on three and one-half sides forms a drip-tight seal with the renewable seat when pressure is applied above the diaphragm. When pressure above the diaphragm is relieved, the valve opens wide. The rate of closing or opening can be controlled by modulating the flow into or out of the cover chamber. When a pressure reversal occurs the valve will immediately close, preventing reverse flow through the valve. The split stem will allow the disc retainer assembly to check closed **regardless of the position of the diaphragm.**

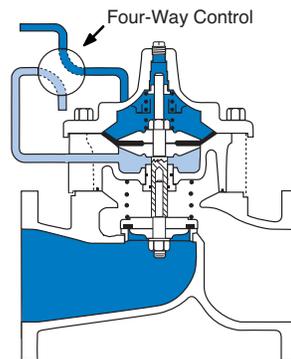
The Model 100-22 Powercheck Valve is recommended on system applications where a positive check feature is necessary to prevent reverse flow.

## Principle of Operation



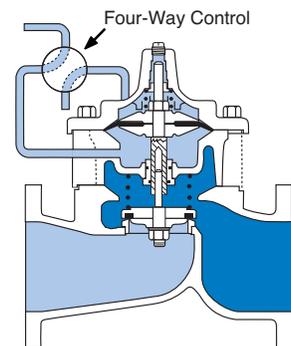
### Full Open Operation

When operating pressure below the diaphragm is greater than the pressure in the cover chamber, the valve is held open, allowing full flow.



### Tight Closing Operation

When pressure below the diaphragm is relieved and operating pressure is applied to the cover chamber, the valve closes drip-tight.



### Check Action

When a static condition or pressure reversal occurs, the split stem design allows the valve to instantly check closed. Return flow is prevented regardless of the diaphragm's position.

Note: For optimum operation of built-in check feature, installation with stem vertically up is recommended.

## Cla-Val 100-22 Powercheck Main Valve Specifications

### Available Sizes

| Pattern        | Flanged             |
|----------------|---------------------|
| Globe (inches) | 4" - 24"            |
| Globe (mm)     | 100 - 600 mm        |
| Angle (inches) | 4", 6", 8"          |
| Angle (mm)     | 100, 150 and 200 mm |

### Operating Temp. Range

| Fluids                          |
|---------------------------------|
| -40° to 180° F<br>-40° to 82° C |



4" Globe, Flanged



6" Globe, Flanged



6" Angle, Flanged

### Pressure Ratings (Recommended Maximum Pressure - psi)

| Valve Body & Cover |              | Pressure Class  |           |           |
|--------------------|--------------|-----------------|-----------|-----------|
|                    |              | Flanged         |           |           |
| Grade              | Material     | ANSI Standards* | 150 Class | 300 Class |
| ASTM A536          | Ductile Iron | B16.42          | 250       | 400       |
| ASTM A216-WCB      | Cast Steel   | B16.5           | 285       | 400       |
| UNS 87850          | Bronze       | B16.24          | 225       | 400       |

Note: \* ANSI standards are for flange dimensions only.  
Flanged valves are available faced but not drilled.

**Valves for higher pressure are available; consult factory for details**

### Materials

| Component                              | Standard Material Combinations                    |              |              |
|--|---|--------------|--------------|
| Body & Cover                           | Ductile Iron                                      | Cast Steel   | Bronze       |
| Available Sizes (inches)               | 4" - 24"  | 4" - 16"     | 4" - 16"     |
| Available Sizes (mm)                   | 100 - 600 mm                                      | 100 - 400 mm | 100 - 400 mm |
| Disc Retainer & Diaphragm Washer       | Cast Iron   | Cast Steel   | Bronze       |
| Trim: Disc Guide, Seat & Cover Bearing | Bronze is Standard<br>Stainless Steel is optional |              |              |
| Disc                                   | Buna-N® Rubber                                    |              |              |
| Diaphragm                              | Nylon Reinforced Buna-N® Rubber                   |              |              |
| Stem, Nut & Spring                     | Stainless Steel                                   |              |              |

For material options not listed, consult factory.  
Cla-Val manufactures valves in more than 50 different alloys.

### Options

#### Epoxy Coating - suffix KC

An FDA approved fusion bonded epoxy coating for use with cast iron, ductile iron or steel valves. This coating is resistant to various water conditions, certain acids, chemicals, solvents and alkalies. Epoxy coatings are applied in accordance with AWWA coating specifications C116-03. Do not use with temperatures above 175°F/ 80° C.

#### Viton® Rubber Parts - suffix KB

Optional diaphragm, disc and o-ring fabricated with Viton® synthetic rubber. Viton® is well suited for use with mineral acids, salt solutions, chlorinated hydrocarbons, and petroleum oils; and is primarily used in high temperature applications up to 250° F/120°C. Do not use with epoxy coating above 175°F/80° C.

**For assistance in selecting appropriate valve options or valves manufactured with special design requirements, please contact our Regional Sales Office or Factory.**

# Functional Data

# Model 100-22

| Valve Size   |               | Inches             | 4    | 6     | 8     | 10    | 12    | 14    | 16    | 18    | 20    | 24    |
|--|---------------|--------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|  |               | mm.                | 100  | 150   | 200   | 250   | 300   | 350   | 400   | 460   | 500   | 600   |
| C <sub>V</sub> Factor                                | Globe Pattern | Gal./Min. (gpm.)   | 136  | 229   | 480   | 930   | 1458  | 1725  | 2110  | 2940  | 3400* | 4020  |
|  |               | Litres/Sec. (l/s.) | 32.5 | 55    | 115   | 223   | 350   | 414   | 506   | 705   | 816   | 965   |
|  | Angle Pattern | Gal./Min. (gpm.)   | 135  | 233   | 545   | —     | —     | —     | —     | —     | —     | —     |
|  |               | Litres/Sec. (l/s.) | 32   | 56    | 132   | —     | —     | —     | —     | —     | —     | —     |
| Equivalent Length of Pipe                            | Globe Pattern | Feet (ft.)         | 251  | 777   | 748   | 621   | 654   | 750   | 977   | 983   | 1125  | 3005  |
|  |               | Meters (m.)        | 76.4 | 237.1 | 228.1 | 189.5 | 199.4 | 228.7 | 298.1 | 299.9 | 343.2 | 916.6 |
|  | Angle Pattern | Feet (ft.)         | 254  | 751   | 580   | —     | —     | —     | —     | —     | —     | —     |
|  |               | Meters (m.)        | 77.6 | 229   | 176.9 | —     | —     | —     | —     | —     | —     | —     |
| K Factor   | Globe Pattern | 12.7               | 23.1 | 15.7  | 10.4  | 8.5   | 8.9   | 10.2  | 8.4   | 8.8   | 19.1  |       |
|  | Angle Pattern | 12.9               | 22.3 | 12.2  | —     | —     | —     | —     | —     | —     | —     |       |
| Liquid Displaced from Cover Chamber When Valve Opens |               | Fl. Oz             | —    | —     | —     | —     | —     | —     | —     | —     | —     |       |
|  |               | U.S. Gal.          | .08  | .17   | .53   | 1.26  | 2.51  | 4.0   | 4.0   | 9.6   | 9.6   | 9.6   |
|  |               | ml                 | —    | —     | —     | —     | —     | —     | —     | —     | —     | —     |
|  |               | Litres             | .30  | .64   | 2.0   | 4.8   | 9.5   | 15.1  | 15.1  | 36.2  | 36.2  | 36.2  |

\*Estimated

### C<sub>V</sub> Factor

Formulas for computing C<sub>V</sub> Factor, Flow (Q) and Pressure Drop (ΔP):

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

### K Factor (Resistance Coefficient)

The Value of K is calculated from the formula:  $K = \frac{894d^4}{C_V^2}$  (U.S. system units)

### Equivalent Length of Pipe

Equivalent lengths of pipe (L) are determined from the formula:  $L = \frac{Kd}{12f}$  (U.S. system units)

### Fluid Velocity

Fluid velocity can be calculated from the following formula:  $V = \frac{.4085 Q}{d^2}$  (U.S. system units)

### Where:

C<sub>V</sub> = U.S. (gpm) @ 1 psi differential at 60° F water or

= (l/s) @ 1 bar (14.5 PSIG) differential at 15° C water

d = inside pipe diameter of Schedule 40 Steel Pipe (inches)

f = friction factor for clean, new Schedule 40 pipe (dimensionless) (from Cameron Hydraulic Data, 18th Edition, P 3-119)

K = Resistance Coefficient (calculated)

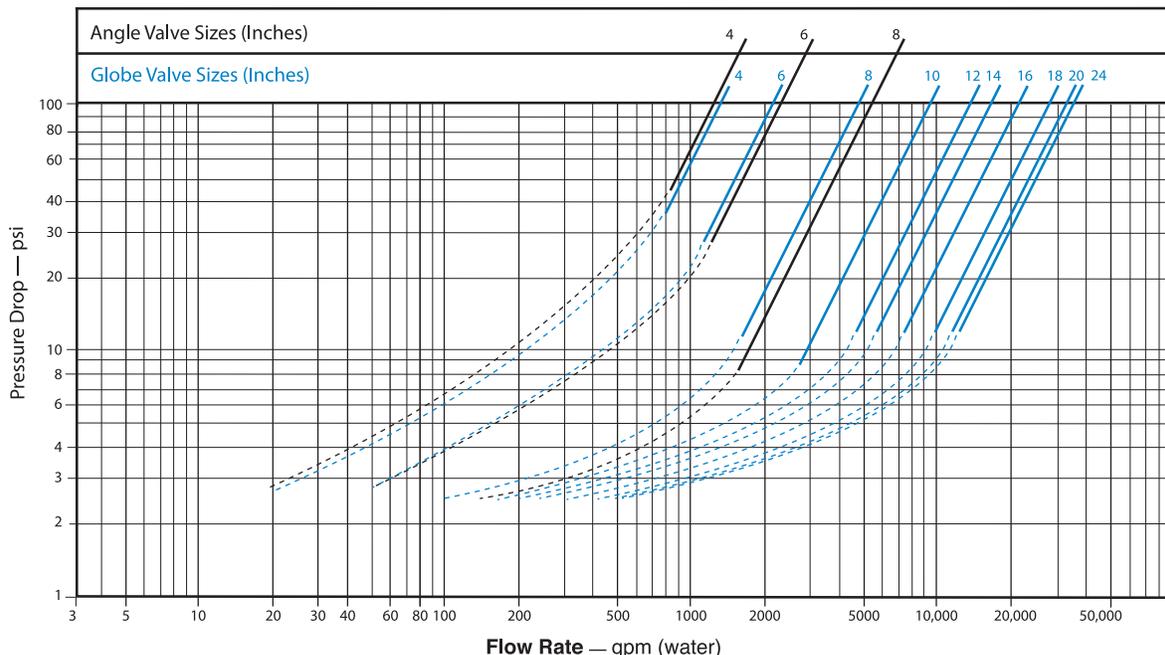
L = Equivalent Length of Pipe (feet)

Q = Flow Rate in U.S. (gpm) or (l/s)

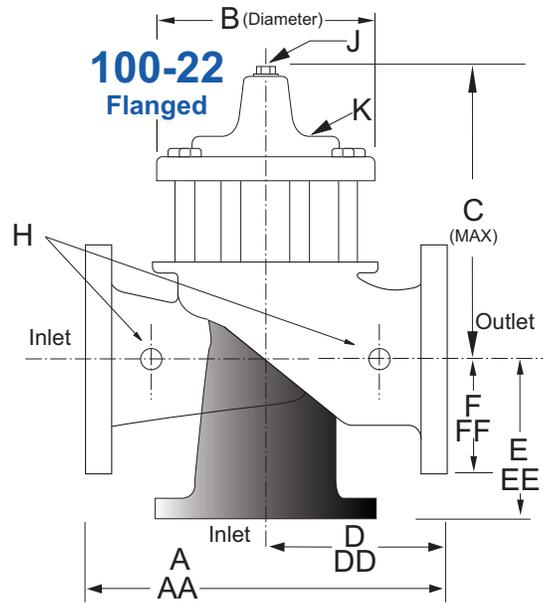
V = Fluid Velocity (feet per second) or (meters per second)

ΔP = Pressure Drop in (psi) or (bar)

## Model 100-22 Flow Chart (Based on normal flow through a wide open valve)



## Cla-Val 100-22 Powercheck Main Valve Dimensions



| Valve Size (Inches)       | 4     | 6     | 8     | 10    | 12    | 14    | 16    | 18    | 20    | 24    |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A 150 ANSI                | 13.88 | 17.75 | 21.38 | 26.00 | 30.00 | 34.25 | 35.00 | 42.12 | 48.00 | 48.00 |
| AA 300 ANSI               | 14.50 | 18.62 | 22.38 | 27.38 | 31.50 | 35.75 | 36.62 | 43.62 | 49.62 | 49.75 |
| B Diameter                | 9.12  | 11.50 | 15.75 | 20.00 | 23.62 | 28.00 | 28.00 | 35.44 | 35.44 | 35.44 |
| C Maximum                 | 11.75 | 15.25 | 20.25 | 23.75 | 27.25 | 29.31 | 34.12 | 35.00 | 40.25 | 40.25 |
| D 150 ANSI                | 6.94  | 8.88  | 10.69 | —     | —     | —     | —     | —     | —     | —     |
| DD 300 ANSI               | 7.25  | 9.38  | 11.19 | —     | —     | —     | —     | —     | —     | —     |
| E 150 ANSI                | 5.50  | 6.75  | 7.25  | —     | —     | —     | —     | —     | —     | —     |
| EE 300 ANSI               | 5.81  | 7.25  | 7.75  | —     | —     | —     | —     | —     | —     | —     |
| F 150 ANSI                | 4.50  | 5.50  | 6.75  | 8.00  | 9.50  | 11.00 | 11.75 | 15.88 | 14.56 | 17.00 |
| FF 300 ANSI               | 5.00  | 6.25  | 7.50  | 8.75  | 10.25 | —     | 12.75 | 15.88 | 16.06 | 19.00 |
| H NPT Body Tapping        | 0.50  | 0.75  | 0.75  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| J NPT Cover Center Plug   | 0.50  | 0.75  | 0.75  | 1.00  | 1.00  | 1.25  | 1.25  | 2.00  | 2.00  | 2.00  |
| K NPT Cover Tapping       | 0.50  | 0.75  | 0.75  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Stem Travel               | 0.80  | 1.10  | 1.70  | 2.30  | 2.80  | 3.40  | 3.40  | 4.50  | 4.50  | 4.5   |
| Approx. Ship Weight (lbs) | 135   | 230   | 480   | 785   | 1410  | 2215  | 2215  | 2300  | 3400  | 3600  |

| Valve Size (mm)           | 100  | 150  | 200  | 250  | 300  | 350  | 400  | 450  | 500  | 600  |
|---------------------------|------|------|------|------|------|------|------|------|------|------|
| A 150 ANSI                | 353  | 451  | 543  | 660  | 762  | 870  | 889  | 1070 | 1219 | 1219 |
| AA 300 ANSI               | 368  | 473  | 568  | 695  | 800  | —    | 930  | 1108 | 1260 | 1263 |
| B Diameter                | 232  | 292  | 400  | 508  | 600  | 711  | 711  | 900  | 900  | 900  |
| C Maximum                 | 298  | 387  | 514  | 603  | 692  | 744  | 867  | 889  | 1022 | 1022 |
| D 150 ANSI                | 176  | 226  | 272  | —    | —    | —    | —    | —    | —    | —    |
| DD 300 ANSI               | 184  | 238  | 284  | —    | —    | —    | —    | —    | —    | —    |
| E 150 ANSI                | 140  | 171  | 184  | —    | —    | —    | —    | —    | —    | —    |
| EE 300 ANSI               | 148  | 184  | 197  | —    | —    | —    | —    | —    | —    | —    |
| F 150 ANSI                | 114  | 140  | 171  | 203  | 241  | 279  | 298  | 403  | 370  | 432  |
| FF 300 ANSI               | 127  | 159  | 191  | 222  | 260  | —    | 324  | 403  | 408  | 483  |
| H NPT Body Tapping        | 0.50 | 0.75 | 0.75 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| J NPT Cover Center Plug   | 0.50 | 0.75 | 0.75 | 1.00 | 1.00 | 1.25 | 1.25 | 2.00 | 2.00 | 2.00 |
| K NPT Cover Tapping       | 0.50 | 0.75 | 0.75 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Stem Travel               | 20   | 28   | 43   | 58   | 71   | 86   | 86   | 86   | 114  | 114  |
| Approx. Ship Weight (kgs) | 61   | 104  | 218  | 356  | 640  | 1006 | 1006 | 1044 | 1544 | 1634 |

Cla-Val Control Valves operate with maximum efficiency when mounted in horizontal piping with the main valve cover UP but other positions are acceptable. Due to component size and weight of 10 inch and larger valves, installation with cover UP is advisable. We recommend isolation valves be installed on inlet and outlet for maintenance. Adequate space above and around the valve for service personnel should be considered essential. A regular maintenance program should be established based on the specific application data. We do, however, recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.