

-MODEL- 100-31 600 Series Powercheck Valve

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

The Cla-Val Model 100-31 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 a 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 100-31 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.



# **Specifications**

#### **Available Sizes**

Pattern	Flanged
Globe	4",6",8",10"
Angle	4",6",8"

Fluids	
-40° to 180° F	

# Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class			
		Flanged			
Grade	Material	ANSI Standards*	150 lb.	300 lb.	
ASTM A536	Ductile Iron	B16.42	250	400	
ASTM A216-WCB	Cast Steel	B16.5	285	400	
ASTM B62	Bronze	B16.24	225	400	
ASTM A743	Stainless Steel	B16.5	285	400	
356-T6	Aluminum	B16.1	275	—	
Note: *ANSI standards are for flange dimensions only. Flanged valves are available faced but not drilled.					

# **Materials**

Component	Material Options				
Body & Cover	Ductile Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Available Sizes	4" - 10"	4" - 10"	4" - 10"	4" - 10"	4" - 10"
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze	Stainless Steel	Aluminum
Trim: Disc Guide, Seat & Cover Bearing	Bronze is standard. Stainless Steel is optional. Stainless Ste			el is standard.	
Disc	Buna-N <sup>®</sup> Rubber				
Diaphragm	Nylon Reinforced Buna-N <sup>®</sup> Rubber				
Stem, Nut & Spring	Stainless S	teel			



6" Globe, Flanged

# **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 C550-90. Do not use with temperatures above 175° F.

## Low Temperature Diaphragm - suffix KA

This single ply diaphragm uses Buna-N® synthetic rubber, formulated for low temperature applications to -65° F. Operating pressures in excess of 125 psi are not recommended.

#### Viton<sup>®</sup> 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. Do not use with epoxy coating above 175°F.

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



6" Angle, Flanged



# **Functional Data**

#### Inches 4 10 6 8 Valve Size mm. 100 150 200 250 Gal./Min. (gpm.) Globe 229 480 930 136 CV Pattern Litres/Sec. (I/s.) 32.5 55 115 223 Factor Gal./Min. (gpm.) Angle 135 233 545 \_ Pattern Litres/Sec. (I/s.) 56 32 132 Feet (ft.) Equivalent Globe 251 777 748 621 Length Pattern Meters (m.) 76.4 237.1 228.1 189.5 of Feet (ft.) Pipe Angle 254 751 580 \_ Pattern Meters (m.) 77.6 229 176.9 **Globe Pattern** κ 127 23.1 15.7 10.4 Factor Angle Pattern 12.9 22.3 12.2 FI. Oz \_ \_ \_ Liquid Displaced U.S. Gal. .08 .17 .53 1.26 from Diaphragm Chamber When ml Valve Opens Litres .30 .64 2.0 4.8

\*Estimated

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

Formulas for computing  $C_V$  Factor, Flow (Q) and Pressure Drop ( $\triangle P$ ):

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

**K** Factor (Resistance Coefficient) The Value of K is calculated from the formula:  $K = \frac{894 d^4}{C_v^2}$ 

#### **Equivalent Length of Pipe**

Equivalent lengths of pipe (L) are determined from the formula:  $L = \frac{K d}{12 f}$ 

#### Fluid Velocity

Fluid velocity can be calculated from the following formula:  $V = \frac{.4085 Q}{d^2}$ 

#### **Application Note**

The distinctive smooth flow path of the 600 series Powercheck valve is engineered to overcome cavitation problems. It's unique design is highly resistant to cavitation damage under severe pressure drops. Tests have proven it to be effective in preventing valve body and seat pitting.

We also offer a free computerized cavitation analysis. This analysis provides cavitation damage information for actual conditions provided by the customer. If there is an application where the potential for cavitation exists, the 600 series Powercheck valve provides substantial resistance to this problem.

#### Where:

f

 $C_V = U.S.$  (gpm) @ 1 psi differential at 60° F water

- (I/s) @ 1 bar (14.5 PSIG) differential at 15° C water
- d = inside pipe diameter of Schedule 40 Steel Pipe (inches)
  - friction factor for clean, new Schedule 40 pipe
     (dimensionless) (from Cameron Hydraulic Data,
     18th Edition)
- K = Resistance Coefficient (calculated)
- Equivalent Length of Pipe (feet)
- $\mathbf{Q}$  = Flow Rate in U.S. (gpm) or (l/s)
- V = Fluid Velocity (feet per second) or (meters per second)
- $\Delta \mathbf{P}$  = Pressure Drop in (psi) or (bar)

## Model 100-31 Flow Chart (Based on normal flow through a wide open valve)



# Model 100 - 31

# **Dimensions**

100-31 (Globe)





### Model 100 - 31

100-31 (Angle)

VALVE SIZE (Inches)	4	6	8	10
A 150 ANSI	13.88	17.75	21.38	26.00
AA 300 ANSI	14.50	18.62	22.38	27.38
<b>B</b> Dia.	9.12	11.50	15.75	20.00
C Max.	8.62	15.25	20.25	23.75
<b>D</b> 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
FF 300 ANSI	5.00	6.25	7.50	8.75
G NPT Body Tapping	1/2	3/4	3/4	1
H NPT Cover Center Plug	1/2	3/4	3/4	1
J NPT Cover Tapping	1/2	3/4	1	1
Valve Stem Internal				
Thread UNF	1/428	1/4-28	³⁄8 <b>-24</b>	3∕8-24
Stem Travel	0.6	0.8	1.7	2.3
Approx. Ship Wt. Lbs.	135	230	480	785
VALVE SIZE (mm)	100	150	200	250
VALVE SIZE (mm) A 150 ANSI	<b>100</b> 353	<b>150</b> 451	<b>200</b> 543	<b>250</b> 660
VALVE SIZE (mm) A 150 ANSI AA 300 ANSI	<b>100</b> 353 368	<b>150</b> 451 473	<b>200</b> 543 568	<b>250</b> 660 695
VALVE SIZE (mm) A 150 ANSI AA 300 ANSI B Dia.	<b>100</b> 353 368 232	<b>150</b> 451 473 292	<b>200</b> 543 568 400	<b>250</b> 660 695 508
VALVE SIZE (mm) A 150 ANSI AA 300 ANSI B Dia. C Max.	100 353 368 232 302	<b>150</b> 451 473 292 387	<b>200</b> 543 568 400 514	<b>250</b> 660 695 508 603
VALVE SIZE (mm) A 150 ANSI AA 300 ANSI B Dia. C Max. D 150 ANSI	100 353 368 232 302 176	<b>150</b> 451 473 292 387 226	<b>200</b> 543 568 400 514 272	<b>250</b> 660 695 508 603 —
VALVE SIZE (mm) A 150 ANSI AA 300 ANSI B Dia. C Max. D 150 ANSI DD 300 ANSI	<b>100</b> 353 368 232 302 176 184	<b>150</b> 451 473 292 387 226 238	<b>200</b> 543 568 400 514 272 284	<b>250</b> 660 695 508 603 —
VALVE SIZE (mm) A 150 ANSI AA 300 ANSI B Dia. C Max. D 150 ANSI DD 300 ANSI E 150 ANSI	<b>100</b> 353 368 232 302 176 184 140	<b>150</b> 451 473 292 387 226 238 171	<b>200</b> 543 568 400 514 272 284 184	250 660 695 508 603 — —
VALVE SIZE (mm) A 150 ANSI AA 300 ANSI B Dia. C Max. D 150 ANSI DD 300 ANSI E 150 ANSI E 300 ANSI	100 353 368 232 302 176 184 140 148	<b>150</b> 451 473 292 387 226 238 171 184	<b>200</b> 543 568 400 514 272 284 184 197	250 660 695 508 603 — — — — —
VALVE SIZE (mm) A 150 ANSI AA 300 ANSI B Dia. C Max. D 150 ANSI DD 300 ANSI E 150 ANSI E 150 ANSI F 150 ANSI	100 353 368 232 302 176 184 140 148 114	<b>150</b> 451 473 292 387 226 238 171 184 140	<b>200</b> 543 568 400 514 272 284 184 197 172	<b>250</b> 660 695 508 603 203
VALVE SIZE (mm)           A 150 ANSI           AA 300 ANSI           B Dia.           C Max.           D 150 ANSI           DD 300 ANSI           E 150 ANSI           E 300 ANSI           F 150 ANSI           F 300 ANSI           F 300 ANSI	<b>100</b> 353 368 232 302 176 184 140 148 114 114 127	<b>150</b> 451 473 292 387 226 238 171 184 140 159	<b>200</b> 543 568 400 514 272 284 184 197 172 191	<b>250</b> 660 695 508 603 203 222
VALVE SIZE (mm)           A 150 ANSI           AA 300 ANSI           B Dia.           C Max.           D 150 ANSI           DD 300 ANSI           E 150 ANSI           F 150 ANSI           FF 300 ANSI           G NPT Body Tapping	100 353 368 232 302 176 184 140 148 114 114 127 ½	150 451 473 292 387 226 238 171 184 140 159 ¾	200 543 568 400 514 272 284 184 197 172 191 ¾	<b>250</b> 660 695 508 603 — — — 203 222 1
VALVE SIZE (mm)           A 150 ANSI           AA 300 ANSI           B Dia.           C Max.           D 150 ANSI           DD 300 ANSI           E 150 ANSI           F 150 ANSI           F 150 ANSI           F 300 ANSI           F 150 ANSI           B NPT Body Tapping           H NPT Cover Center Plug	100 353 368 232 302 176 184 140 148 114 127 ½	150 451 473 292 387 226 238 171 184 140 159 ¾ ¾	200 543 568 400 514 272 284 184 197 172 191 3⁄4 3⁄4	<b>250</b> 660 695 508 603 — — — 203 222 1 1
VALVE SIZE (mm) A 150 ANSI AA 300 ANSI B Dia. C Max. D 150 ANSI DD 300 ANSI E 150 ANSI E 300 ANSI F 150 ANSI FF 300 ANSI G NPT Body Tapping H NPT Cover Center Plug J NPT Cover Tapping	100 353 368 232 302 176 184 140 148 114 127 ½ ½	150 451 473 292 387 226 238 171 184 140 159 ½ ¼ <sup>½</sup> 4	200 543 568 400 514 272 284 184 197 172 191 3⁄4 3⁄4 3⁄4	<b>250</b> 660 695 508 603 — — — 203 222 1 1 1 1
VALVE SIZE (mm) A 150 ANSI AA 300 ANSI B Dia. C Max. D 150 ANSI DD 300 ANSI E 150 ANSI E 300 ANSI F 150 ANSI FF 300 ANSI G NPT Body Tapping H NPT Cover Center Plug J NPT Cover Tapping Valve Stem Internal	100 353 368 232 302 176 184 140 148 114 127 ½ ½	150         451         473         292         387         226         238         171         184         140         159         ¾         ¾         ¾	200 543 568 400 514 272 284 184 197 172 191 3⁄4 3⁄4 3⁄4	<b>250</b> 660 695 508 603 — — — 203 222 1 1 1 1
VALVE SIZE (mm) A 150 ANSI AA 300 ANSI B Dia. C Max. D 150 ANSI DD 300 ANSI E 150 ANSI E 150 ANSI F 150 ANSI FF 300 ANSI G NPT Body Tapping H NPT Cover Center Plug J NPT Cover Tapping Valve Stem Internal Thread UNF	100 353 368 232 302 176 184 140 148 114 127 ½ ½ ½	150 451 473 292 387 226 238 171 184 140 159 ¾ ¾ ¾ ¾ ¾	200 543 568 400 514 272 284 184 197 172 191 3⁄4 3⁄4 3⁄4 3⁄4 3⁄4	250 660 695 508 603   203 222 1 1 1 1 <sup>3</sup> / <sub>2</sub> -24
VALVE SIZE (mm) A 150 ANSI AA 300 ANSI B Dia. C Max. D 150 ANSI DD 300 ANSI E 150 ANSI E 300 ANSI F 150 ANSI FF 300 ANSI G NPT Body Tapping H NPT Cover Center Plug J NPT Cover Tapping Valve Stem Internal Thread UNF Stem Travel	100 353 368 232 302 176 184 140 148 114 127 ½ ½ ½ ½ ½ ½ ½ 20	150 451 473 292 387 226 238 171 184 140 159 ¾ ¾ ¾ ¾ ¾ ¾ 3⁄4 28	200 543 568 400 514 272 284 184 197 172 191 <sup>3</sup> ⁄ <sub>4</sub> <sup>3</sup> ⁄ <sub>4</sub>	250 660 695 508 603   203 222 1 1 1 <sup>3</sup> / <sub>6</sub> -24 58

# Service and Installation

Cla-Val Control Valves operate with maximum efficiency when mounted in horizontal piping with the main valve cover UP, however, 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. However, we recommend a thorough inspection be done at least once a year. Consult factory for specific recommendations.



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**Represented By:**