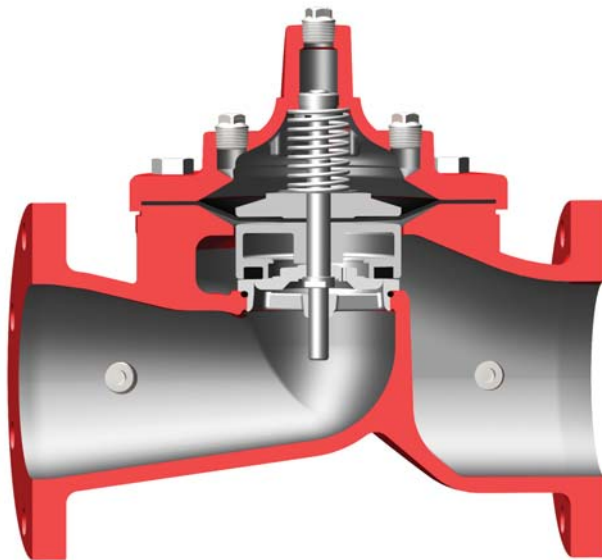


# Seawater Service Hytrol Valve

- **Reduced Cavitation Design**
- **Drip-Tight, Positive Seating Action**
- **Service Without Removal From Line**
- **Globe or Angle Pattern**
- **Every Valve Factory Tested**



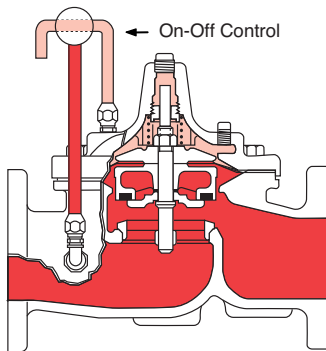
The Cla-Val Model 100-29S Seawater Service Hytrol Valve is a hydraulically operated, diaphragm actuated, globe or angle pattern valve. It consists of three major components: body, diaphragm assembly and cover. The diaphragm assembly is the only moving part.

The diaphragm assembly is guided top and bottom by a precision machined stem which utilizes a non-wicking diaphragm of nylon fabric bonded with synthetic rubber. A resilient synthetic rubber disc, retained on three and one-half sides by a disc retainer, forms a drip-tight seal with the renewable seat when pressure is applied above the diaphragm.

The reduced cavitation characteristics of the 100-29S Seawater Service Hytrol Valve is the basis for the Cla-Val 600 Series. The rugged simplicity of design and packless construction assure a long life of dependable, trouble-free operation. It's smooth flow passages and fully guided disc and diaphragm assembly assure optimum control when used in piping systems requiring remote control, pressure regulation, solenoid operation, rate of flow control or check valve operation.

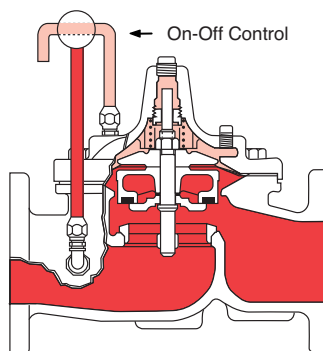
Available in various materials and in a wide range of sizes. It's applications are unlimited.

## Principle of Operation



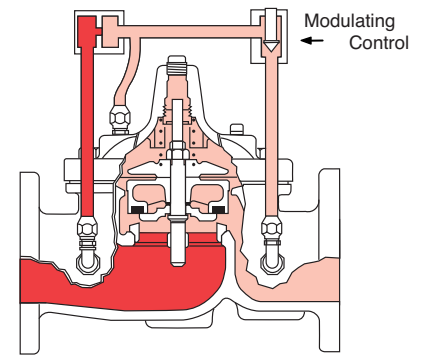
**Full Open Operation**

When pressure in the cover chamber is relieved to a zone of lower pressure, the line pressure at the valve inlet opens the valve, allowing full flow.



**Tight Closing Operation**

When pressure from the valve inlet is applied to the cover chamber, the valve closes drip-tight.



**Modulating Action**

The valve holds any intermediate position when operating pressure is equal above and below the diaphragm. Using a Cla-Val "Modulating" Control will allow the valve to automatically compensate for line pressure changes.

## Specifications

Model 100-29S

### Available Sizes

Pattern	Flanged
Globe	3", 4", 6", 8", 10", 12", 16", 18", 20", 24", 30", 36"
Angle	4", 6", 8"

### Operating Temp. Range

Fluids
-40° to 180° F

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

Valve Body & Cover		Pressure Class		
		Flanged		
Material	Material Specifications	ANSI Standards**	150 Class	300 Class
Ductile Iron*	ASTM-A536	B16.42	250	400
Cast Steel*	ASTM A216	B16.5	285	400
Naval Bronze	ASTM B61	B16.24	225	400
Stainless Steel Type 316	ASTM A743-CF-8M	B16.5	285	400
Ni.AL.Bronze	ASTM B148	B.16.24	225	400
Super Duplex Stainless Steel		B16.5	285	400

Note: \* Fusion Bonded Epoxy Coated Internal and External.  
 \*\* 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**



3" Globe, Flanged



6" Globe, Flanged

## Materials

Component	Standard Material Combinations					
Body & Cover	Ductile Iron	Cast Steel	Bronze	Stainless Steel Type 316	Ni. AL. Bronze	Super Duplex Stainless Steel
Available Sizes	3" - 36"	3" - 16"	3, -16"	3" -16"	3" -16"	3" -16"
Disc Retainer & Diaphragm Washer	Cast Iron	Cast Steel	Bronze	Bronze	Ni. AL. Bronze	Super Duplex Stainless Steel
Trim: Disc Guide, Seat & Cover Bearing	Bronze is Standard 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.



6" Angle, 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 C116-03. Do not use with temperatures above 175° F.

### Water Treatment Clearance - suffix KW

This additional clearance is beneficial in applications where water treatment compounds can interfere with the closing of the valve. The smaller outside diameter disc guide provides more clearance between the disc guide and the valve seat. This option is best suited for valves used in on-off (non-modulating) service.

### 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. Do not use with epoxy coatings above 175° F.

### Heavy Spring - suffix KH

The heavy spring option is used in applications where there is low differential pressure across the valve, and the additional spring force is needed to help the valve close. This option is best suited for valves used in on-off (non-modulating) service.

**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 100-29S

Valve Size		Inches	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48
		mm.	80	100	150	200	250	300	350	400	460	500	600	750	900	1000	1200
$C_V$ Factor	Globe Pattern	Gal./Min. (gpm.)	62	136	229	480	930	1458	1725	2110	2940*	3400*	4020	7900*	11910*	14500*	15800*
		Litres/Sec. (l/s.)	15	32.5	55	115	223	350	414	506	705	816	966	1895	2858	3483	3796
	Angle Pattern	Gal./Min. (gpm.)	—	135	233	545	CF**	CF**	CF**	CF**	CF**	CF**	CF**	—	—	—	—
		Litres/Sec. (l/s.)	—	32	56	132	CF**	CF**	CF**	CF**	CF**	CF**	CF**	—	—	—	—
Equivalent Length of Pipe	Globe Pattern	Feet (ft.)	293	251	777	748	621	654	750	977	983	1125	3005	2130	2862	4232	7028
		Meters (m.)	89.3	76.4	237.1	228.1	189.5	199.4	229	298	300	343	917	650	872	1290	2142
	Angle Pattern	Feet (ft.)	—	254	751	580	CF**	CF**	CF**	CF**	CF**	CF**	CF**	—	—	—	—
		Meters (m.)	—	77.6	229	176.9	CF**	CF**	CF**	CF**	CF**	CF**	CF**	—	—	—	—
K Factor	Globe Pattern	20.6	12.7	23.1	15.7	10.4	8.5	8.9	10.2	8.4	8.8	19.1	10.5	9.7	12.3	17.8	
	Angle Pattern	—	12.9	22.3	12.2	CF**	CF**	CF**	CF**	CF**	CF**	CF**	—	—	—	—	
Liquid Displaced from Cover Chamber When Valve Opens	Fl. Oz	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	U.S. Gal.	0.32	.08	.17	.53	1.26	2.51	4.0	4.0	9.6	9.6	9.6	29.0	42	90	90	
	ml	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Litres	.12	.30	.64	2.0	4.8	9.5	15.1	15.1	36.2	36.2	36.2	110	197	340	340	

\*\*Consult Factory

\*Estimated

### $C_V$ Factor

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

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

### 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:

$C_V$  = 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)

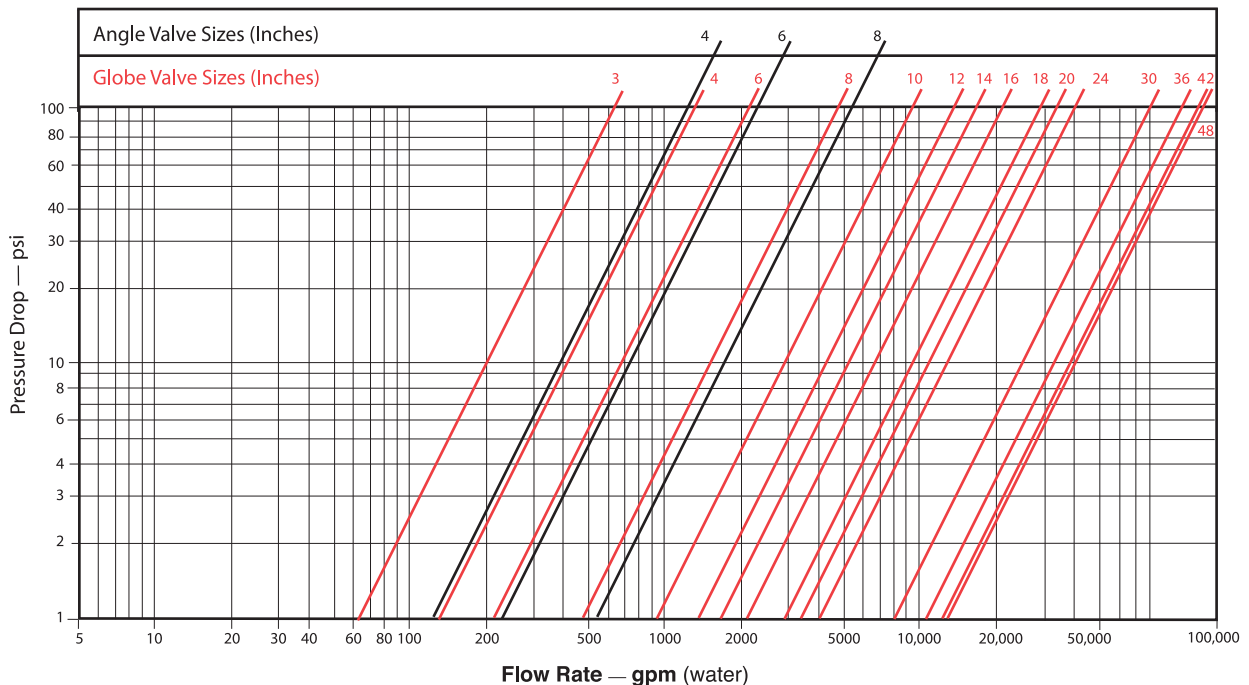
L = Equivalent Length of Pipe (feet)

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

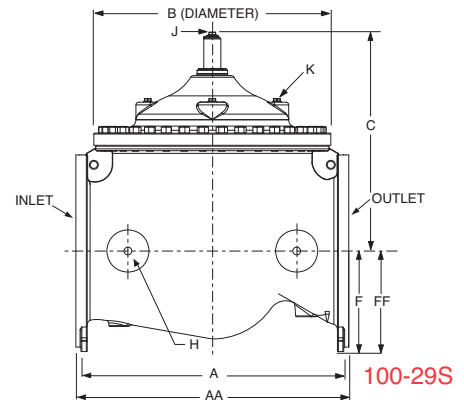
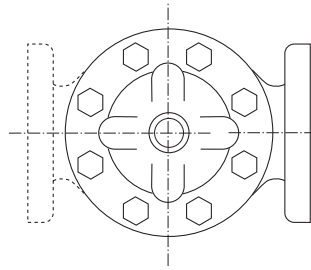
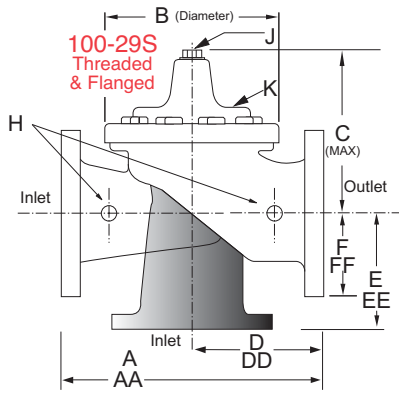
V = Fluid Velocity (feet per second) or (meters per second)

$\Delta P$  = Pressure Drop in (psi) or (bar)

## Model 100-29S Flow Chart (Based on normal flow through a wide open valve)



## Dimensions



Valve Size (Inches)	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48
A 150 ANSI	10.25	13.88	17.75	21.38	26.00	30.00	34.25	35.00	42.12	48.00	48.00	63.25	65.00	76.00	94.50
AA 300 ANSI	11.00	14.50	18.62	22.38	27.38	31.50	35.75	36.62	43.63	49.62	49.75	63.75	67.00	76.00	94.50
B Dia.	6.62	9.12	11.50	15.75	20.00	23.62	27.47	28.00	35.44	35.44	35.44	53.19	56.00	66.00	66.00
C Max.	7.00	8.62	11.62	15.00	17.88	21.00	20.88	25.75	25.00	31.50	31.50	43.94	54.60	61.50	61.50
D 150 ANSI	—	6.94	8.88	10.69	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
DD 300 ANSI	—	7.25	9.38	11.19	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
E 150 ANSI	—	5.50	6.75	7.25	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
EE 300 ANSI	—	5.81	7.25	7.75	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
F 150 ANSI	3.75	4.50	5.50	6.75	8.00	9.50	11.00	11.75	15.88	14.56	17.00	19.88	25.50	28.00	31.50
FF 300 ANSI	4.12	5.00	6.25	7.50	8.75	10.25	—	12.75	15.88	16.06	19.00	22.00	27.50	28.00	31.50
H NPT Body Tapping	.375	.50	.75	.75	1	1	1	1	1	1	1	1	2	2	2
J NPT Cover Center Plug	.50	.50	.75	.75	1	1	1.25	1.25	2	2	2	2	2	2	2
K NPT Cover Tapping	.375	.50	.75	.75	1	1	1	1	1	1	1	1	2	2	2
Valve Stem Internal Thread UNF	10-32	¼-28	¼-28	¾-24	¾-24	¾-24	¾-24	¾-24	½-20	½-20	½-20	¾-16	¾-16	M20	M20
Stem Travel	0.6	0.8	1.1	1.7	2.3	2.8	3.4	3.4	4.5	4.5	6.5	7.5	8.5	8.5	8.5
Approx. Ship Wt. Lbs.	45	85	195	330	625	900	1250	1380	1500	2551	2733	6500	8545	12450	13100

\*Consult Factory

Note: The top two flange holes on valve sizes 36 thru 48 are threaded to 1 1/2"-6 UNC.

Valve Size (mm)	80	100	150	200	250	300	350	400	450	500	600	750	900	1000	1200
A 150 ANSI	260	353	451	543	660	762	870	889	1070	1219	1219	1607	1651	1930	2400
AA 300 ANSI	279	368	473	568	695	800	908	930	1108	1260	1263	1619	1702	1930	2400
B Dia.	168	232	292	400	508	600	698	711	900	900	900	1351	1422	1676	1676
C Max.	178	219	295	381	454	533	530	654	635	800	800	1116	1387	1562	1562
D 150 ANSI	—	176	226	272	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
DD 300 ANSI	—	184	238	284	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
E 150 ANSI	—	140	171	184	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
EE 300 ANSI	—	148	184	197	CF*	CF*	CF*	CF*	CF*	CF*	CF*	—	—	—	—
F 150 ANSI	95	114	140	171	203	241	279	298	403	370	432	505	648	711	800
FF 300 ANSI	105	127	159	191	222	260	—	324	403	408	483	559	699	711	800
H NPT Body Tapping	.375	.50	.75	.75	1	1	1	1	1	1	1	1	2	2	2
J NPT Cover Center Plug	.50	.50	.75	.75	1	1	1.25	1.25	2	2	2	2	2	2	2
K NPT Cover Tapping	.375	.50	.75	.75	1	1	1	1	1	1	1	1	2	2	2
Valve Stem Internal Thread UNF	10-32	¼-28	¼-28	¾-24	¾-24	¾-24	¾-24	¾-24	½-20	½-20	½-20	¾-16	¾-16	M20	M20
Stem Travel	15	20	28	43	58	71	86	86	86	114	114	165	191	216	216
Approx. Ship Wt. Kgs.	20	39	89	150	284	409	568	627	681	1157	1249	2951	3876	5647	5942

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

## 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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