



**SEGMENTED BALL  
CONTROL VALVE**

**VXL<sup>®</sup>**



## INTRODUCTION

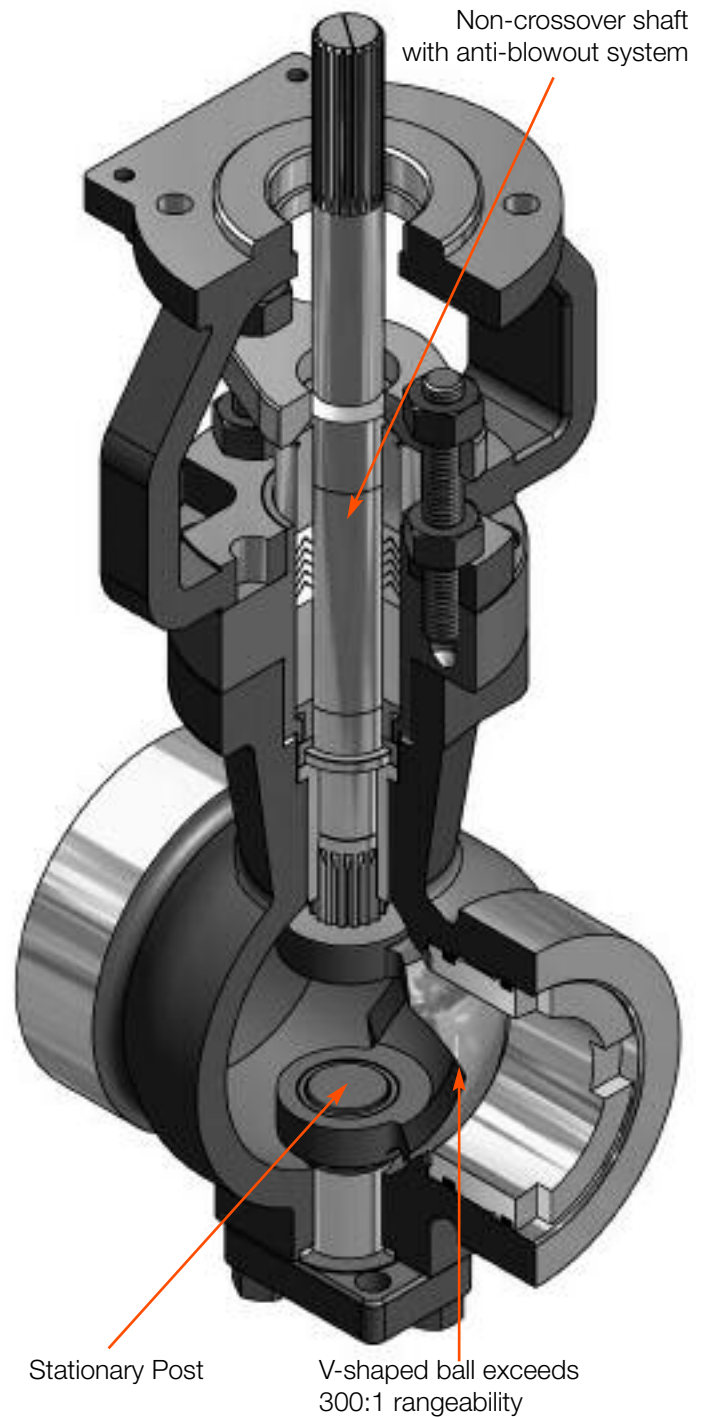
The  $\sqrt{XL}$  segmented ball control valve was developed as a simple, lightweight and more economical alternative to the renowned and advanced design of Valtek Sulamericana VB segmented ball control valve. This valve combines the sturdiness characteristics of integral body globe valves with the typical efficiency of rotary valves.

Designed to overcome the challenges of controlling industrial processes for slurry, fibers or particulate material fluid services, the  $\sqrt{XL}$  valve provides accurate and reliable control for a broad range of applications in chemical, pulp & paper, power, and oil & gas industries. The V-shaped ball assures to the  $\sqrt{XL}$  control valve an excellent operational performance and, its superior 300:1 rangeability allows an exceptional control in applications involving gases, liquids and steam.

Available in sizes from 1 to 8 inches and, in a wide variety of materials such as carbon steel, stainless steel and alloy steel bodies, the  $\sqrt{XL}$  valve was designed to operate with temperatures from -20 to 600 °F (-28 to 315 °C) and pressure ranges corresponding to ANSI 150 and 300 or DIN PN 16 - 40.

$\sqrt{XL}$  valves may be supplied either with flangeless or integral flanges body. The V-shaped segmented ball provides accurate control of the fluid within all opening angles, while its self-centering seat and the pressure assisted bi-directional sealing system assures high levels of tightness. All these features together make the  $\sqrt{XL}$  valve one of the most advanced segmented ball valve in the world market.

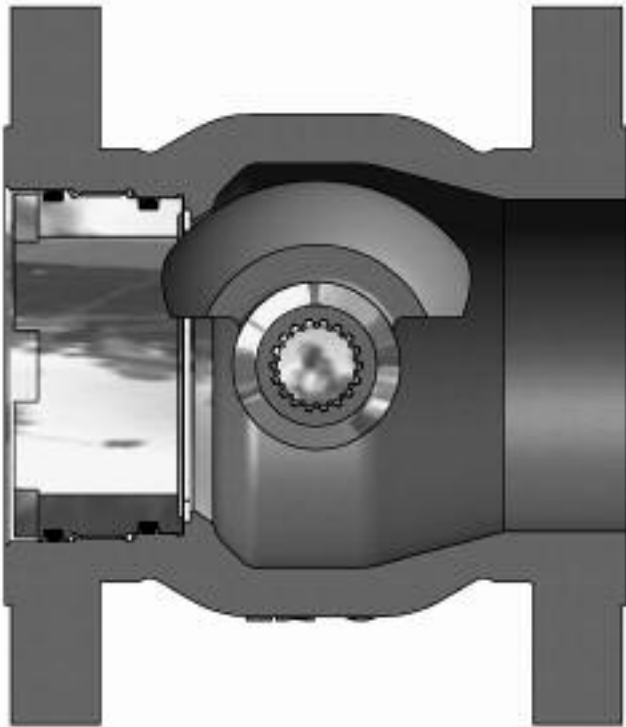
**BODY SUB-ASSEMBLY (FIGURE 1)**



**Rangeability higher than 300:1**

**ANSI Class IV Shutoff — Metal Seat**  
**ANSI Class VI Shutoff — Soft Seat**

VALVE OPEN (FIGURE 2)



STATIONARY POST (FIGURE 3)



## Reliability

The VxL ball valve has a rugged, single-piece body that eliminates the eventual effects of tensions imposed by piping. Therefore, its sealing through the seat and the sealing of the body itself to the external environment are not affected as it may occur with valves that use the split-bodies concept. The V-shaped segmented ball provides a rangeability over 300:1 and its cutting action is excellent to control fiber-containing fluids.

Sealing is performed through an exclusive pressure-assisted system, which in the metal seat version reaches tightness levels above those required by ANSI B16.104/FCI-70.2, Class IV and, on the soft seat version meets the requirements of Class VI. With self centering seat and no adjusting rings it provides, in addition to the progressive high-quality sealing, simplified installation and easy maintenance. The seat assembly can be replaced without needing to remove the ball and shaft, which makes the VxL maintenance quick and easy.

The ball assembly into the driving shaft is done by means of a precise splined connection that eliminates clearances and loss of movements. The combination of a large and rugged stationary post (Fig. 3) with a robust ball and a shaft manufactured with hardened 17-4PH as standard material, results in a trim assembly with great tightness and long service life.

These characteristics combined with the use of: spring-cylinder actuators, with proven life longer than a million of cycles; HPP1500 Analog Positioners or HPP3000 and HPP3500 Digital Positioners, which provide an accurate and refined process control; Packing boxes with large depth that meet the EPA requirements\*; Shaft with anti-blowout system that complies with ANSI B16.34; make the VxL one of the most modern, advanced and accurate segmented ball valve existing in the world market.

\*EPA = U. S. Environmental Protection Agency

## SEAT CONFIGURATIONS (TABLE I)

The V $\overline{XL}$  control valve can be provided with several seat configurations, according to the application and the flow direction. The seat or the seat rings assembly, as required, is adjusted in the valve body through a sturdy and stable retainer that provides long service life to the entire assembly, even in corrosive environment.

### METAL

This is the standard configuration, comprised by a single metal seat. This system is used only on valves with the flow direction downstream.

Description	Shaft orientation	Shutoff Class
One metal seat	Downstream	IV

### DUAL\*

This is also a standard configuration, comprised by a soft seat and one or two metal backup seats.

Description	Shaft orientation	Shutoff Class
One soft seat plus one metal seat	Downstream	IV
One soft seat plus two metal seats	Upstream	VI

\*Not available on sizes 1 & 1.5 inch.

### SOFT

This is a configuration used when it is not possible to use the metal backup seats due to the potential for galling in valves with special materials, that do not allow hardening or coating of the ball. This configuration is comprised by a single soft seat that allows bi-directional flow, as well as applications with oxygen service or corrosive fluids.

Description	Shaft orientation	Shutoff Class
One soft seat	Downstream	IV
One soft seat	Upstream	VI

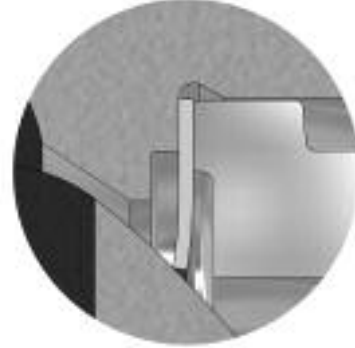
### BI-DIRECTIONAL METAL\*

This is a sealing configuration comprised by two metal seats, used in applications requiring bi-directional flow.

Description	Shaft orientation	Shutoff Class
Two metal seats	Upstream Downstream	IV

\*Not available on sizes 1 & 1.5 inch.

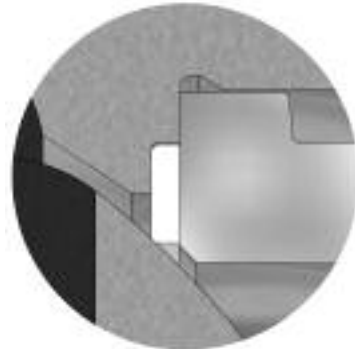
### METAL SEAT (FIGURE 4)



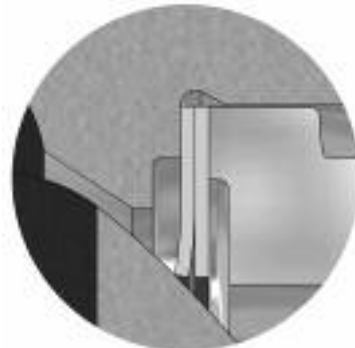
### DUAL SEAT (FIGURE 5)



### SOFT SEAT (FIGURE 6)



### BI-DIRECTIONAL METAL SEAT (FIGURE 7)



# SPECIFICATION

BODY SPECIFICATIONS (TABLE II)	
<b>Sizes (inches)</b>	1; 1.5; 2; 3; 4; 6; 8
<b>End Connections</b>	<ul style="list-style-type: none"> <li>■ RF Flanges</li> <li>■ Flangeless</li> </ul>
<b>Face Finish</b>	Standard 125-250 Ra
<b>Ratings</b>	<ul style="list-style-type: none"> <li>■ ANSI Class 150-300</li> <li>■ DIN PN 16 - 40</li> </ul>
<b>Shutoff</b>	<ul style="list-style-type: none"> <li>■ ANSI Class IV with Metal Seat</li> <li>■ ANSI Classe VI with Soft Seat</li> </ul>
<b>Operating Temperature</b>	-20 to 600°F (-28 a 315°C)

TEMPERATURE LIMITS FOR PACKINGS (TABLE III)		
MATERIAL TYPE	TEMPERATURE*	
	°F	°C
<b>PTFE V-Rings</b>	-20 to 450	-28 to 232
<b>Braided PTFE</b>	-20 to 500	-28 to 260
<b>Graphite</b>	-20 to 600	-28 to 315
<b>PT</b>	-20 to 450	-28 to 232
<b>PTG</b>	-20 to 450	-28 to 232
<b>PTG XT</b>	-20 to 550	-28 to 288

\*The body rating and packing temperature vs. pressure limits shall not be exceeded

TEMPERATURE & PRESSURE LIMITS FOR GASKETS (TABLE IV)				
GASKET MATERIAL	PRESSURE		TEMPERATURE	
	Psi	Bar	°F	°C
<b>PTFE</b>	725	50	350	176
<b>316 SS/Graphite</b>	725	50	600	315

BEARING/SHAFT CONFIGURATION (TABLE V)		
BEARING SPECIFICATION	MBT (1)	ULTIMET
<b>Configurations</b>	Standard	Optional
<b>Material</b>	UNS S 31600 / PTFE	UNS R 31233
<b>Shaft</b>	Standard	Standard
<b>Temperature Limits</b>	-20 to 425°F (-28 to 218°C)	-20 to 600°F (-28 to 315°C)
<b>Applications</b>	<ul style="list-style-type: none"> <li>■ General Service</li> <li>■ Special alloy valves</li> <li>■ Clean for O2 service</li> <li>■ NACE</li> </ul>	<ul style="list-style-type: none"> <li>■ Corrosive Service</li> <li>■ Clean for O2 service</li> </ul>

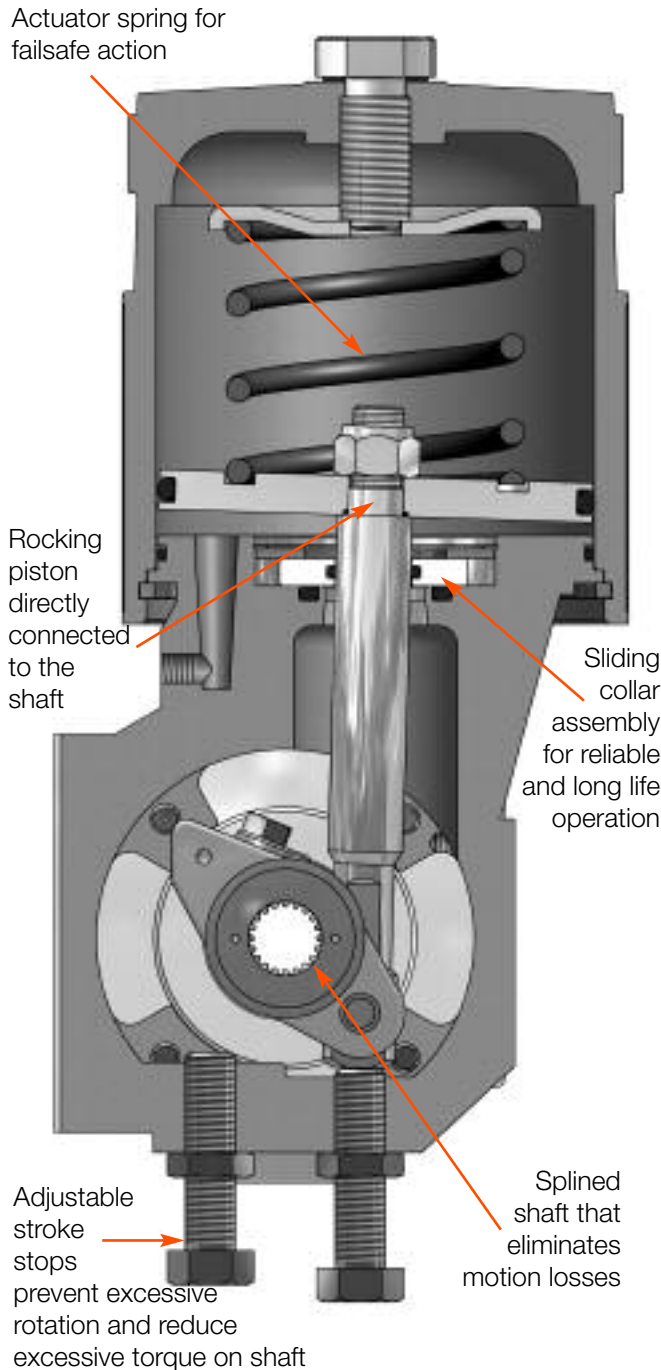
(1) MBT bearings are standard also for valves manufactured with special alloys such as Hastelloy-C, Monel, Titanium, Alloy 20.

LEAKAGE CLASS (TABLE VI)			
SEAT TYPE	CONFIGURATION	SHAFT ORIENTATION	ANSI LEAKAGE CLASS
<b>Metal</b>	One metal seat	Downstream	IV
<b>Dual</b>	One soft seat / one metal seat	Downstream	IV
	One soft seat / two metal seat	Upstream	VI
<b>Soft</b>	One soft seat	Downstream	IV
		Upstream	VI
<b>Bi-directional Metal</b>	Two metal seat	Downstream	IV
		Upstream	IV
<b>Flow Ring</b>	No seat	Downstream	II*
		Upstream	II*

\* Flow rings are usually used on throttling applications. Even with the valve fully closed, allowable leakage is approximately ANSI Class II.



## ROTARY ACTUATOR SERIES RA-XL (FIGURE 8)



**High parts interchangeability -  
Reduces the need for spare parts**

**Lightweight and compact design -  
Helps handling and needs limited space**

## Actuators

The RA-XL spring-cylinder rotary actuator combines high torque and pneumatic stiffness with an excellent controllability. These characteristics are integrated into a single, rugged, lightweight and compact assembly, which makes it the ideal choice for rotary valves driving.

The RA-XL double acting spring-cylinder actuator is designed to operate with air supply pressures up to 150 psi (10.3 Bar), reaching high operating torques. The actuator Series RA-XL has a proven lifetime longer than a million of cycles, which makes it the most reliable actuator in the market. The double acting positioner feeds both cylinder chambers simultaneously, ensuring an exceptional stiffness. This pneumatic stiffness makes the actuator Series RA-XL insuperable when an accurate control of the valve positioning is required, even when the valve is operating at small openings.

These features enable a much better performance of the actuator Series RA-XL when compared with the spring-diaphragm type actuators.

### ACTUATOR SPECIFICATIONS (TABLE VII)

<b>Type</b>	<ul style="list-style-type: none"> <li>■ Double acting cylinder with positive spring for failsafe action</li> <li>■ Field reversible</li> </ul>
<b>Sizes</b>	25, 50, 100, 200
<b>Action</b>	<ul style="list-style-type: none"> <li>■ Air-to-Open</li> <li>■ Air-to-Close</li> <li>■ Fail-in-place</li> </ul>
<b>Air Supply Pressure</b>	Up to 150 psi maximum 10.3 Bar maximum
<b>Stroking Speed</b>	Aprox. 1 inch/sec.*
<b>Operating Temperature</b>	-40 to 350°F (-40 to 175°C)
<b>Auxiliary handwheel</b>	<ul style="list-style-type: none"> <li>■ Declutchable Side Assembly</li> <li>■ Manual, gear operated</li> <li>■ Lever</li> </ul>
<b>Positioners</b>	<ul style="list-style-type: none"> <li>■ HPP1500 Analog</li> <li>■ HPP3000 Digital</li> <li>■ HPP3500 Digital</li> </ul>

\* Sizes 25 and 50 with 60 psig air supply.

### MATERIALS OF CONSTRUCTION (TABLE VIII)

<b>Yoke</b>	Ductile Iron
<b>Transfer Case</b>	Anodized Aluminum
<b>Splined Lever Arm</b>	Nickel Plated Ductile Iron
<b>Actuator Stem</b>	UNS S 41600 Stainless Steel
<b>Bearings</b>	Teflon reinforced with fiberglass filaments
<b>Sliding Collar</b>	Delrin®, Aluminum
<b>Cylinder Retaining Ring</b>	Zinc Plated steel
<b>Piston</b>	Anodized Aluminum
<b>Cylinder</b>	Anodized Aluminum
<b>O-rings*</b>	Buna N (Standard)
<b>Actuator Spring</b>	Steel (corrosion proof)
<b>Spring Button</b>	Carbon Steel

\* Room temperature higher than 180°F (82°C) require Viton o-rings.  
Temperatures lower than -40°F (-40°C) require Fluorsilicone o-rings.

### Positioners

FOR THROTTLING APPLICATIONS, THE ROTARY ACTUATORS SERIES RA-XL ALLOW THE USE OF SEVERAL POSITIONER OPTIONS.

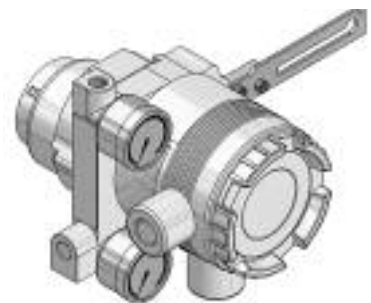


#### DIGITAL HPP3500 SERIES (FIGURE 9)

This positioner has the same characteristics of HPP3000, 4-20 mA input signal and HART® protocol. This project was developed to make easier the positioner installation on rotary actuators with NAMUR interface. Intrinsically safe, this positioner is provided with NEMA 4X and IEC IP66 enclosure and can handle air supply pressures from 20 to 100 psig (1.4 to 6.9 Bar) at operating temperatures from -40 to 176°F (-40 - 80°C).

#### DIGITAL HPP3000 SERIES (FIGURE 10)

This is a high performance microprocessed positioner, compatible with HART®, DE and Fieldbus communication protocols or 4-20 mA analog signal, also programmable for several split range configuration. This positioner Series incorporates totally programmable functions such as: auto-tuning, manual and automatic modes, multiple communication protocols and diagnostic information, which contribute to increase productivity and efficiency of industrial plant operations and to lower maintenance. The digital positioner Series HPP3000 can handle air supply pressures from 20 to 100 psig (1.4 to 6.9 Bar) at operating temperatures from -40 to 176°F (-40 to 80°C).



#### ANALOG HPP1500 SERIES (FIGURE 11)

This is a single or double acting high performance positioner. It allows the use of a pneumatic module for pneumatic input signals or an analog electro-pneumatic module for control signals in milliamps. Highly resistant and using the state-of-the-art technology, it works with air supply pressures up to 150 psig (10.3 Bar) without requiring air pressure regulators and withstands ambient temperatures from -40 to 176°F (-40 to 80°C). The positioner Series HPP1500 allows two or three split-range configurations with the use of a specific cam.



# MATERIALS OF CONSTRUCTION

**STANDARD MATERIALS OF CONSTRUCTION  
CARBON STEEL SUB-ASSEMBLY (TABLE IX)**

ITEM	MATERIAL CLASSIFICATION	SPECIFICATION		
		ASTM CODE (AMS No.)	UNS CODE	HARDNESS R <sub>C</sub>
<b>Body</b>	Carbon Steel (Casting)	A 216 WCB	J 03002	
<b>Ball</b>	317 (Casting), Chrome Plated	A 351 Gr CG8M	J 93000	
	316L / Alloy #6*	A 351 Gr CF3M / AMS 5387	J 92800 / R 30006	40-42
<b>Shaft</b>	17-4 PH (Bar)	A 564 Gr 630	S 17400	35
<b>Post</b>	17-4 PH (Casting)	A 747 Gr CB7-Cu-1	J 92180	35-38
<b>Bearings</b>	MBT	A 479 Gr 316 / PTFE	S 31600	
	Ultimet	B 818	R 31233	30
<b>Seat Retainer</b>	316 (Casting), Chrome Plated	A 351 Gr CF8M	J 92900	
<b>Metal Seat</b>	316 Strip		S 31600	
	Inconel Strip			
<b>Soft Seat</b>	PTFEG			
	PEEK			
	TEFZEL			
<b>Gland Flange</b>	316 (Casting)	A 351 Gr CF8M	J 92900	
<b>Packing Follower</b>	316 (Bar)	A 479 Gr 316	S 31600	
<b>Packing Spacers</b>	316 (Bar)	A 479 Gr 316	S 31600	

\*Solid Alloy #6 for valves with sizes up to 6 inches

**STANDARD MATERIALS OF CONSTRUCTION  
STAINLESS STEEL SUB-ASSEMBLY (TABLE X)**

ITEM	MATERIAL CLASSIFICATION	ESPECIFICATION		
		ASTM CODE (AMS No.)	UNS CODE	HARDNESS R <sub>C</sub>
<b>Body</b>	316 (Casting)	A 351 Gr CF8M	J 92900	
<b>Ball</b>	317 (Casting), Chrome Plated	A 351 Gr CG8M	J 93000	
	316L / Alloy #6*	A 351 Gr CF3M / AMS 5387	J 92800 / R 30006	40-42
<b>Shaft</b>	17-4 PH (Bar)	A 564 Gr 630	S 17400	35
<b>Post</b>	17-4 PH (Casting)	A 747 Gr CB7-Cu-1	J 92180	35-38
<b>Bearings</b>	MBT	A 479 Gr 316 / PTFE	S 31600	
	Ultimet	B 818	R 31233	30
<b>Seat Retainer</b>	316 (Casting), Chrome Plated	A 351 Gr CF8M	J 92900	
<b>Metal Seat</b>	316 Strip		S 31600	
	Inconel Strip			
<b>Soft Seat</b>	PTFEG			
	PEEK			
	TEFZEL			
<b>Gland Flange</b>	316 (Casting)	A 351 Gr CF8M	J 92900	
<b>Packing Follower</b>	316 (Bar)	A 479 Gr 316	S 31600	
<b>Packing Spacers</b>	316 (Bar)	A 479 Gr 316	S 31600	

\*Solid Alloy # for valves with sizes up to 6 inches



# MATERIALS

**PRESSURE AND TEMPERATURE LIMITS FOR VALVE BODIES  
– ANSI B 16.34 (TABLE XI)**

MATERIAL	CLASS	PRESSURE		TEMPERATURE		
		PSI	BAR	°F	°C	
<b>Carbon Steel ASTM A 216 Gr. WCB</b>	<b>ANSI 150</b>	285	19.7	-20 to 100	-29 to 38	
		260	17.9	200	93	
		230	15.9	300	149	
		200	13.8	400	204	
		170	11.7	500	260	
		140	9.7	600	316	
	<b>ANSI 300</b>	740	51.0	-20 to 100	-29 to 38	
		675	46.5	200	93	
		655	45.2	300	149	
		635	43.8	400	204	
		600	41.4	500	260	
		550	37.9	600	316	
	<b>Stainless Steel ASTM A 351 Gr. CF8M</b>	<b>ANSI 150</b>	275	19.0	-20 to 100	-29 to 38
			235	16.2	200	93
215			14.8	300	149	
195			13.4	400	204	
170			11.7	500	260	
140			9.7	600	316	
<b>ANSI 300</b>		720	49.7	-20 to 100	-29 to 38	
		620	42.8	200	93	
		560	39.4	300	149	
		515	35.5	400	204	
		480	33.1	500	260	
		450	31.0	600	316	

# MATERIALS / SPECIFICATIONS

**OPTIONAL MATERIALS OF CONSTRUCTION (TABLE XII)**

Material	304	304L	316L	Monel	Alloy 20	Hastelloy C	Hast. B/B2	Titanium
ASTM	A351 CF8	A351 CF3	A351 CF3M	A494 M35-1	A351 CN 7M	A494-CW6M	A494 N-7M-1	B367 Gr. 3
Body & Bonnet	304	304L	316L	Monel 400	Alloy 20	Hastelloy C	Hast. B/B2	Titanium
Ball	304, Crome Plated	304L, Crome Plated	316L, Crome Plated	Monel 400	Alloy 20	Hastelloy C	Hast. B/B2	Titanium
Shaft	17-4PH	17-4PH	17-4PH	K-Monel	Alloy 20	Hastelloy C	Hast. B/B2	Titanium
Post	17-4PH	17-4PH	17-4PH	Monel 400	Alloy 20	Hastelloy C	Hast. B/B2	Titanium
Seat Retainer	304, Crome Plated	304L, Crome Plated	316L, Crome Plated	Monel 400	Alloy 20	Hastelloy C	Hast. B/B2	Titanium
Seat Ring	316/PTFEG	316/PTFEG	316/PTFEG	PTFEG	PTFEG	PTFEG	PTFEG	PTFEG
Bearings	MBT	MBT	MBT	MBT	MBT	MBT	MBT	MBT

**MAXIMUM ALLOWABLE PRESSURE DROP - SHAFT & POST (TABLE XIII)\***

SHAFT MATERIAL: 17-4 PH

Temperature °F (°C)	Valve Size (inches)						
	1	1.5	2	3	4	6	8
	Upstream Flow – Psi (Bar)						
-50 (-45)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
70 (21)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
200 (93)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
300 (149)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
400 (204)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
425 (218)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
600 (315)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
Temperature °F (°C)	Valve Size (inches)						
	1	1.5	2	3	4	6	8
	Downstream Flow – Psi (Bar)						
-50 (-45)	725 (50.0)	725 (50.0)	560 (38.6)	725 (50.0)	565 (39.0)	725 (50.0)	700 (48.2)
70 (21)	725 (50.0)	725 (50.0)	560 (38.6)	725 (50.0)	565 (39.0)	725 (50.0)	700 (48.2)
200 (93)	725 (50.0)	725 (50.0)	530 (36.5)	725 (50.0)	525 (36.2)	725 (50.0)	650 (44.8)
300 (149)	725 (50.0)	725 (50.0)	500 (34.4)	725 (50.0)	485 (33.4)	725 (50.0)	610 (42.0)
400 (204)	725 (50.0)	725 (50.0)	470 (32.4)	725 (50.0)	450 (31.0)	725 (50.0)	585 (40.3)
425 (218)	725 (50.0)	725 (50.0)	460 (31.7)	725 (50.0)	415 (28.6)	725 (50.0)	550 (37.9)
600 (315)	675 (46.5)	675 (46.5)	410 (28.2)	725 (50.0)	380 (26.2)	725 (50.0)	515 (35.5)

\*Body rating shall not be exceeded.

**MAXIMUM ALLOWABLE PRESSURE DROP - SEATS (TABLE XIV)\***

**SEAT MATERIAL: GLASS FILLED PTFE (PTFEG)**

Temperature °F (°C)	Valve Size (inches)						
	1	1.5	2	3	4	6	8
	Upstream Flow – Psi (Bar)						
-50 (-45)	725 (50.0)	616 (42.4)	500 (34.4)	350 (24.1)	280 (19.3)	270 (18.6)	280 (19.3)
70 (21)	725 (50.0)	616 (42.4)	500 (34.4)	350 (24.1)	280 (19.3)	270 (18.6)	280 (19.3)
200 (93)	600 (41.3)	600 (41.3)	500 (34.4)	350 (24.1)	280 (19.3)	265 (18.2)	275 (18.9)
300 (149)	400 (27.5)	400 (27.5)	400 (27.5)	350 (24.1)	275 (18.9)	260 (17.9)	270 (18.6)

Temperature °F (°C)	Valve Size (inches)						
	1	1.5	2	3	4	6	8
	Downstream Flow – Psi (Bar)						
-50 (-45)	725 (50.0)	702 (48.4)	550 (37.9)	480 (33.1)	370 (25.5)	360 (24.8)	360 (24.8)
70 (21)	725 (50.0)	702 (48.4)	550 (37.9)	480 (33.1)	370 (25.5)	360 (24.8)	360 (24.8)
200 (93)	600 (41.3)	600 (41.3)	550 (37.9)	480 (33.1)	360 (24.8)	355 (24.4)	355 (24.4)
300 (149)	400 (27.5)	400 (27.5)	400 (27.5)	470 (32.4)	360 (24.8)	350 (24.1)	350 (24.1)

**SEAT MATERIAL: 316 STAINLESS STEEL**

Temperature °F (°C)	Valve Size (inches)						
	1	1.5	2	3	4	6	8
	Upstream Flow – Psi (Bar)						
-50 (-45)	725 (50.0)	616 (42.4)	512 (35.3)	364 (25.1)	288 (19.8)	270 (18.6)	280 (19.3)
70 (21)	725 (50.0)	616 (42.4)	512 (35.3)	364 (25.1)	288 (19.8)	270 (18.6)	280 (19.3)
200 (93)	725 (50.0)	604 (41.6)	504 (34.7)	356 (24.5)	282 (19.4)	264 (18.2)	276 (19.0)
300 (149)	725 (50.0)	546 (37.6)	495 (34.1)	351 (24.2)	278 (19.1)	261 (18.0)	272 (18.7)
400 (204)	725 (50.0)	588 (40.5)	490 (33.7)	346 (23.8)	274 (18.9)	258 (17.8)	268 (18.5)
425 (218)	725 (50.0)	583 (40.2)	485 (33.4)	342 (23.5)	270 (18.6)	253 (17.4)	264 (18.2)
600 (315)	725 (50.0)	536 (36.9)	448 (30.8)	318 (21.9)	252 (17.3)	236 (16.2)	244 (16.8)

Temperature °F (°C)	Valve Size (inches)						
	1	1.5	2	3	4	6	8
	Downstream Flow – Psi (Bar)						
-50 (-45)	725 (50.0)	702 (48.4)	559 (38.5)	489 (33.7)	370 (25.5)	362 (24.9)	361 (24.9)
70 (21)	725 (50.0)	702 (48.4)	559 (38.5)	489 (33.7)	370 (25.5)	362 (24.9)	361 (24.9)
200 (93)	725 (50.0)	690 (47.6)	549 (37.8)	480 (33.1)	364 (25.1)	355 (24.4)	355 (24.4)
300 (149)	725 (50.0)	680 (46.9)	542 (37.3)	473 (32.6)	368 (25.3)	350 (24.1)	350 (24.1)
400 (204)	725 (50.0)	670 (46.2)	534 (36.8)	466 (32.1)	353 (24.3)	345 (23.8)	345 (23.8)
425 (218)	725 (50.0)	665 (45.8)	530 (36.5)	461 (31.8)	350 (24.1)	340 (23.4)	341 (23.5)
600 (315)	725 (50.0)	613 (42.2)	488 (33.6)	426 (29.3)	323 (22.2)	315 (21.7)	315 (21.7)

\*Body rating shall not be exceeded.

# MATERIALS / SPECIFICATIONS

## MAXIMUM ALLOWABLE PRESSURE DROP - BEARINGS (TABLE XV)\*

### BEARINGS MATERIAL: MBT

Temperature °F (°C)	Valve Size (inches)						
	1	1.5	2	3	4	6	8
	Upstream or Downstream Flow - Psi (Bar)						
-50 (-45)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
70 (21)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
200 (93)	600 (41.3)	600 (41.3)	600 (41.3)	600 (41.3)	600 (41.3)	600 (41.3)	600 (41.3)
300 (149)	490 (33.7)	490 (33.7)	490 (33.7)	490 (33.7)	490 (33.7)	490 (33.7)	490 (33.7)
400 (204)	375 (25.8)	375 (25.8)	375 (25.8)	375 (25.8)	375 (25.8)	375 (25.8)	375 (25.8)
425 (218)	350 (24.1)	350 (24.1)	350 (24.1)	350 (24.1)	350 (24.1)	350 (24.1)	350 (24.1)

### BEARINGS MATERIAL: ULTIMET

Temperature °F (°C)	Valve Size (inches)						
	1	1.5	2	3	4	6	8
	Upstream or Downstream Flow - Psi (Bar)						
-50 (-45)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
70 (21)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
200 (93)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
300 (149)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
400 (204)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
425 (218)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)
600 (315)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)	725 (50.0)

\*Body rating shall not be exceeded.

## MAXIMUM ALLOWABLE PRESSURE DROP (1)(2)(3) ACTUATOR SIZE VS. SUPPLY PRESSURE - PSI/BAR (TABLE XVI)

Valve Size (inches)	Failure Position	Actuator Size																	
		25						50						100					
		Air Supply Pressure																	
		PSI	Bar	PSI	Bar	PSI	Bar	PSI	Bar	PSI	Bar	PSI	Bar	PSI	Bar	PSI	Bar	PSI	Bar
60	4.1	80	5.5	100	6.9	60	4.1	80	5.5	100	6.9	60	4.1	80	5.5	100	6.9		
1	OPEN	725	50.0	725	50.0	725	50.0												
	CLOSED	725	50.0	725	50.0	725	50.0												
1.5	OPEN	725	50.0	725	50.0	725	50.0												
	CLOSED	725	50.0	725	50.0	725	50.0												
2	OPEN	725	50.0	725	50.0	725	50.0												
	CLOSED	725	50.0	725	50.0	725	50.0												
3	OPEN	336	23.1	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0						
	CLOSED	369	25.4	369	25.4	369	25.4	725	50.0	725	50.0	725	50.0						
4	OPEN	N/A	N/A	302	20.8	302	20.8	725	50.0	725	50.0	725	50.0						
	CLOSED	12	0.80	12	0.80	12	0.80	454	31.3	454	31.3	454	31.3						
6	OPEN							559	38.5	563	38.8	563	38.8	725	50.0	725	50.0	725	50.0
	CLOSED							134	9.20	134	9.20	134	9.20	N/A	N/A	725	50.0	725	50.0
8	OPEN							316	21.7	319	22.0	319	22.0	536	36.9	567	39.1	725	50.0
	CLOSED							52	3.50	52	3.50	52	3.50	N/A	N/A	725	50.0	725	50.0

(1) With shaft downstream and PTFE standard packing. (2) The body rating shall not be exceeded, as well the pressure/temperature limits of shaft, seats and bearings. (3) For throttling applications, the actuator stiffness and the opening angle shall be considered.

# PACKINGS

THE VXL® PACKING BOX HAS A LARGE DEPTH AND AN EXCELLENT FINISH OF INTERNAL SURFACES, WHICH PROVIDES A LONGER OPERATING LIFE FOR THE WHOLE PACKING SET. DUE TO ITS DESIGN CHARACTERISTICS, THE VXL® PACKING BOX ALLOWS THE USE OF A LARGE VARIETY OF PACKING SYSTEMS FOR A BETTER COMPLIANCE WITH THE MOST STRINGENT STANDARDS CONCERNING FUGITIVE EMISSION CONTROL IN MODERN INDUSTRIAL PROCESSES.

## STANDARD PACKING (FIGURE 12)

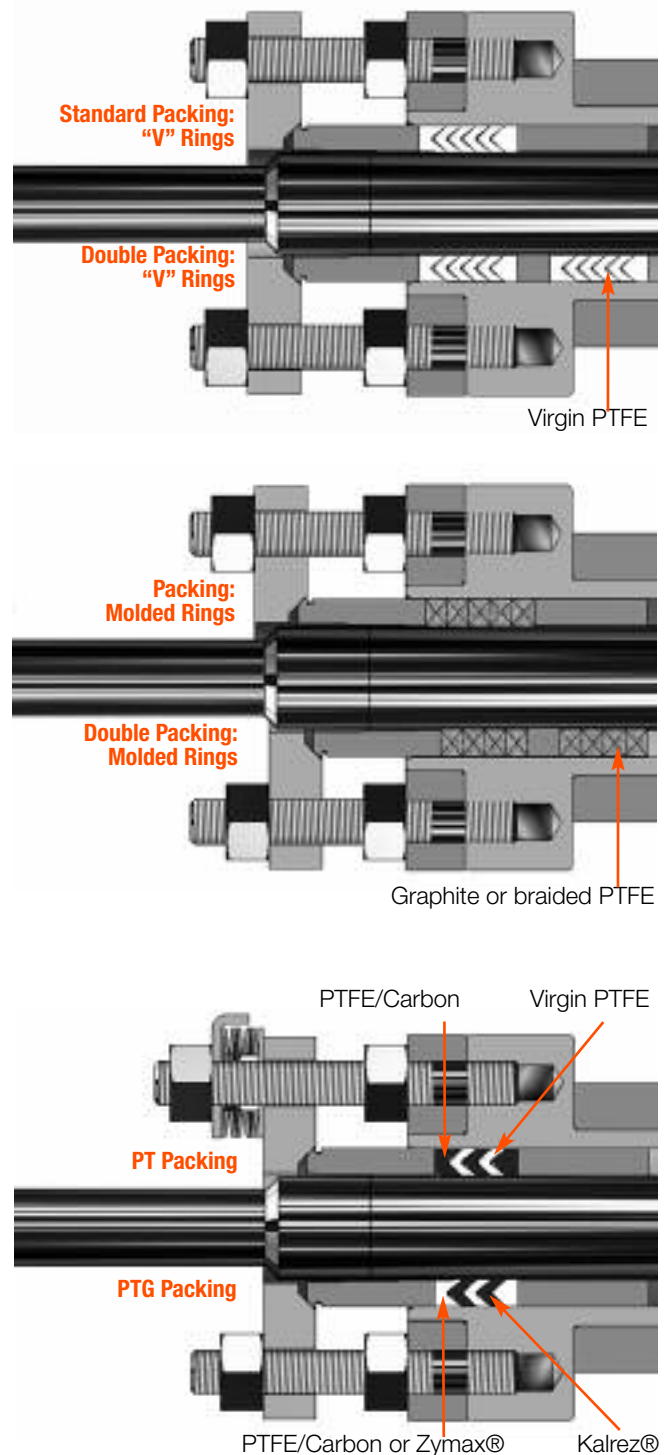
The standard packing of VXL® valves is comprised by PTFE “V” Rings. The PTFE “V” Rings have been the most largely used packing material for many years, with excellent tightness results. Its low friction characteristics, good mechanical strength and excellent corrosion resistance make it the most commonly used material for stem and shaft sealing. The PTFE “V” rings are used in the VXL® valve with operating temperatures from -150 to 450°F (-100 to 232°C).

## HIGH TEMPERATURE PACKING (FIGURE 13)

The VXL® packing with molded rings is an option when the operating temperature exceeds the limits of PTFE “V” rings. The materials used for VXL® molded packings are braided PTFE for operating temperatures up to 500°F (260°C) and graphite for operating temperatures up to 600°F (315°C). The graphite molded rings packing is an excellent solution for high temperature applications. However, the high force required for its sealing causes a considerably friction increase in the valve rotation.

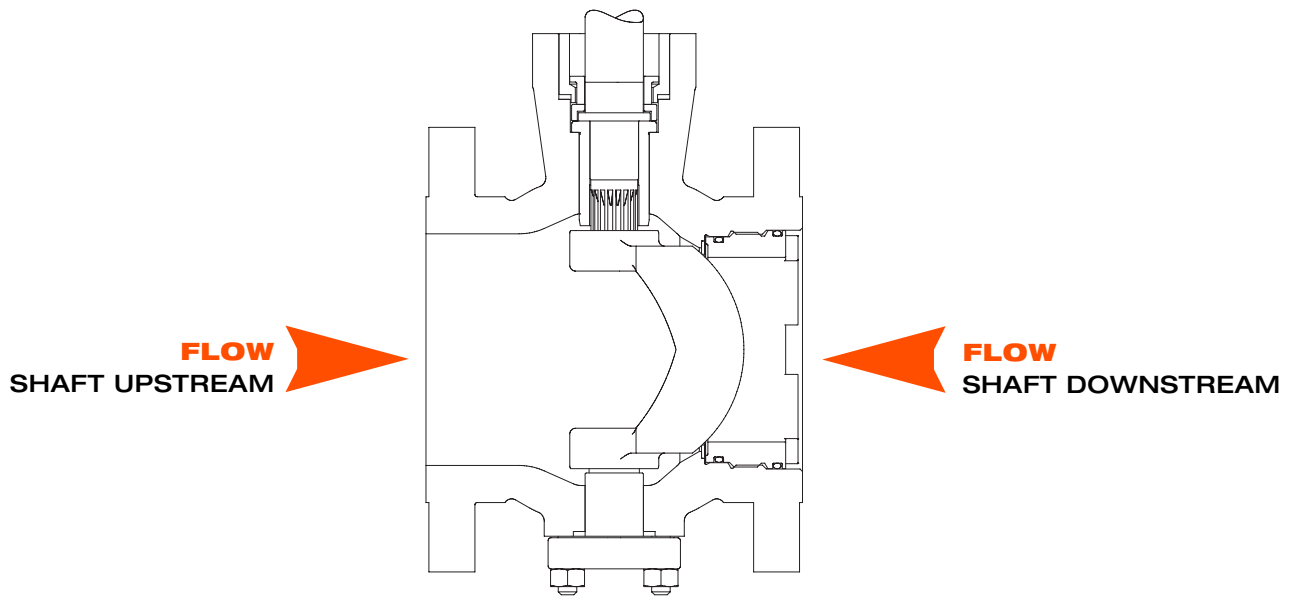
## SPECIAL PACKINGS (FIGURE 14)

The PT packing type is comprised by a “V” rings set, uniformly and constantly compressed by a mechanical device which includes pairs of belleville washers that acts as springs and provides a “live load” effect. This system reaches a tightness level below 500 ppm. The PT packing type combines the superior quality of virgin PTFE rings with carbon filled PTFE rings. The PTG packing type is comprised by an advanced set of rings able to maintain levels of emission much lower than 500 ppm (usually 10 ppm). The PTG packing combines carbon filled PTFE “V” rings with Kalrez® “V” rings, an advanced material which provides a superior packing performance. The PTG XT packing type is used for higher temperatures, up to 550°F (288°C). It uses Zymax® “V” rings replacing the carbon filled PTFE rings.





# FLOW COEFFICIENTS



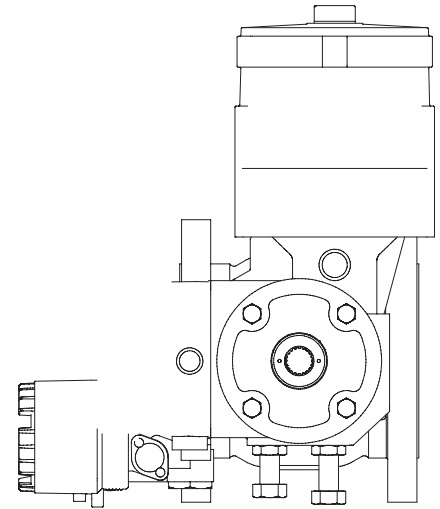
**FLOW COEFFICIENTS ( $C_V$ ) - SHAFT DOWNSTREAM (TABLE XVII)**

Valve Size (inches)	Opening Angle (degrees)								
	90	80	70	60	50	40	30	20	10
1	23	16	11.8	8.4	5.7	3.3	1.75	0.65	0.08
1.5	49	36	25	17.5	11.6	6.4	3.1	0.98	0.15
2	105	71	48	34	23	13.9	7.4	2.8	0.40
3	273	200	135	95	65	39	21	8.3	1.29
4	447	311	210	143	91	49	26	11.0	2.0
6	846	623	424	303	216	134	76	32	6.6
8	1340	943	684	496	343	213	121	55	11.0

**FLOW COEFFICIENTS ( $C_V$ ) - SHAFT UPSTREAM (TABLE XVIII)**

Valve Size (inches)	Opening Angle (degrees)								
	90	80	70	60	50	40	30	20	10
1	24	20	14.6	10.3	6.7	3.8	1.85	0.65	0.12
1.5	50	42	31	21	13.9	7.7	3.8	1.25	0.21
2	108	83	57	38	24.2	14.2	7.2	2.6	0.40
3	271	229	166	112	72	41	20	6.8	0.95
4	446	369	266	171	104	53	24	9.3	1.86
6	835	748	573	404	266	155	86	36	7.3
8	1373	1186	891	623	412	241	127	52	10

# DIMENSIONS – VALVE WITH ACTUATOR AND HPP1500 POSITIONER



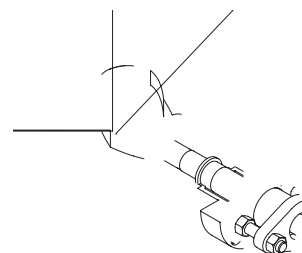
“A”= FACE-TO-FACE DIMENSION

**DIMENSIONS (TABLE XIX)**

Valve Size (inches)	ANSI Class	Actuator size	A		B		E*		F		G		K**		L	
			Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm
1	150-300	25	4.0	102	3.1	80	6.0	152	13.2	335	4.6	116	8.9	227	10.7	271
1.5	150-300	25	4.5	114	3.3	83	6.0	152	13.2	335	4.6	116	8.9	227	11.6	294
2	150-300	25	4.9	124	3.3	83	6.0	152	13.2	335	4.6	116	8.9	227	11.8	300
3	150-300	25	6.5	165	4.4	111	6.0	152	13.2	335	4.6	116	8.9	227	13.9	354
	150-300	50	6.5	165	4.4	111	8.0	203	18.3	465	5.6	144	9.8	250	13.9	354
4	150-300	25	7.6	194	4.9	125	6.0	152	13.2	335	4.6	116	8.9	227	14.5	368
	150-300	50	7.6	194	4.9	125	8.0	203	18.3	465	5.6	144	9.8	250	14.5	368
6	150-300	50	9.0	229	7.4	188	8.0	203	18.3	465	5.6	144	9.8	250	18.5	471
	150-300	100	9.0	229	7.4	188	11.0	279	22.6	575	7.0	179	10.9	276	18.5	471
8	150-300	50	9.6	243	8.2	209	8.0	203	18.3	465	5.6	144	9.8	250	19.3	490
	150-300	100	9.6	243	8.2	209	11.0	279	22.6	575	7.0	179	10.9	276	19.3	490

\*Clearance required for actuator disassembly. \*\*For HPP1500 pneumatic positioner, deduct 2.40 inches (61 mm) from the dimension “K”.

# ACTUATOR - MOUNTING ORIENTATIONS



## STANDARD LEFT HAND MOUNTING - SHAFT DOWSTREAM

MOUNTING C

MOUNTING D

AIR-TO-CLOSE: **FAIL-OPEN**



AIR-TO-OPEN: **FAIL-CLOSE**