

FLO•TITE™
valves & controls

V-Ball Control Valves

Modulating Control Ball Valves



DESIGN FEATURES

- Higher Flow Capacities
- Excellent Repeatability
- Bubble-Tight Shut-Off
- Precise Flow Control
- Non-Clogging Flow-Streams for General And Slurry Applications
- Compact Control Package
- High pressure drop capability available with special order.

V-Ball Control Valves STANDARD PRODUCT NUMBER

- V3-15 Vball
- V4-30 Vball
- V5-60 Vball
- V6-90 Vball

- Self-Compensating Live-Loaded Stem Packing
- Maintenance Is As Easy As Changing A Standard Seat
- High Temperature seats available
- Pneumatically Or Electrically Controlled, 3-15 PSI or 4-20 MA
- Matched Ball and Stem Connection
- Economical Low Operating Cost

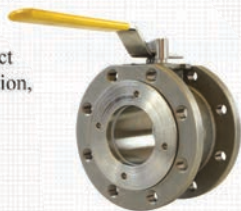
www.flotite.com

Flo-Tite's Ball Control Valves Features a solid stainless steel ball, not a seat insert like many others.

Ball Valves have an inherent equal percentage characteristic flow curve which is very desirable for a majority of control applications. The standard and full round port valves as well as V-Ports exhibit equal percentage characteristics.

Compact Series

Full Port - Size - 3/4" - 6"
Full Flanged Wafer, Compact Design, Low Torque Operation, Cavity Filled option, Steam Jacket option.
Compact Control Package
Characterized Linear V & Slotted Ball
Tech Bulletin page 111



Sentinel Series

Trunnion Design
Spring Loaded Single Seat
Lowest Torque Design
V Port Segmented Ball
Accurate Control over 90° Rotation with Fast Accurate Response to Signal Change
Tech Bulletin page 68
Sizes 3/4" - 24"



Full-Flo Series

ISO Type Mounting Pad
Anti-Static Device
ANSI Class 150, 300, 600
Metal Seats Class V & VI
Size 1/2 Thru 12"
V-Ball Control Valves
Fire Safe-API 607 & NACE
Tech Bulletin page 58



Multi Choice

3 Piece Series
1/4" thru 4" 1500 PSI
All Types of Ends
Weld-in Place SW & BW
Flanged End Class 150, 300
Metal Seats Class V & VI
Tech Bulletin page 45



Uni-Flo Series

ISO Type Mounting Pad
One Piece Body
Anti-Static Device
ANSI Class, 150, 300, 600
Metal Seats Class V & VI
Size 3/4" Thru 12"
Fire Safe-API 607 & NACE
Tech Bulletin page 58



Tri-Pro Series

High pressure 3 Piece Series
Full & Reduced Bore
1/4" thru 4" 2250 PSI
Fire safe to API 607-4
ANSI B16.34
Protected Seat design
Captive Seats & Seals
Weld-in Place SW & BW options
Flanged End Class 600 & 900
Metal Seats Class V & VI
Tech Bulletin page 51



Segment Ball Control Valve

This series is a concentric segment ball valve for modulating service. V-notch cut at disc improves rangeability and creates shearing effect by disc and seal ring. Therefore, suitable for large flow variations and/or control of fluids with fiber and/or slurry.



EZ Series

Reduced Bore Ball Valves are Ideal for Control Applications.
ISO Type Mounting Pad
2 Piece Body
Anti-Static Grounding Device
ANSI Class 150, 300, 600
Metal Seats Meeting Class VI
Size Range 4" Thru 12"
V-Ball Control Valves
Fire Safe-API 607 And NACE
Tech Bulletin page 70



Titan Series

High Pressure 3 Piece Series
1/4" thru 2" 5000 WOG
V Ball Control Valve
Fire Safe, ANSI B16.34
NPT, SW, BW and
ANSI Class 900 &
ANSI Class 1500
RF or RTJ Flanged End
Metal Seats Class V & VI
Tech Bulletin page 53



Flo-Tites V-Type control valves are designed to offer maximum Cv 's which are substantially larger than other throttling globe type control valves. In many cases, the use of short pattern valves result in cost savings for the valves, the actuator and in maintenance.

VAC D400 Digital Positioners

The D400 Digital "Smart Positioner" is a microprocessor based, "intelligent" instrument that can be mounted to rotary pneumatic actuators for accurate positioning and control. This unit, while sophisticated in its design, accuracy and performance, is simple to install and calibrate. Available with HART, FOUNDATION Fieldbus, or Profibus communication, the D400 range of applications and communication capabilities meets the latest industry standards.

- Microprocessor based "Smart" positioner
- User friendly. Menu driven programming
- LCD on board display (multilingual)
- Push button configuration-no handheld device necessary
- Low air consumption
- Proven, dependable design
- Modular design-Feedback, switches and other options available.
- Aluminum Housing- Nema 4X IP 65 Enclosure is standard
- Unique adaptive control feature is built-in as standard
- Explosion Proof, ATEX, FM, CSA, IEC approvals are available.
- Finish is electrostatically dipped with stove oven hardened epoxy resin
- Available for both rotary and linear valves



Max-Seal Complete Series of Butterfly Type Control Valves



Full Port VF150/VF300 V200/V300 VHPF40/VHPF50											
Valve Size	V Port Angle	Percent and Angle of Ball Rotation									
		10% 9°	20% 18°	30% 27°	40% 36°	50% 45°	60% 54°	70% 63°	80% 72°	90% 81°	100% 90°
1/2"	15°	0.04	0.18	0.44	0.69	0.99	1.64	2.12	2.85	3.64	4.30
	30°	0.04	0.23	0.47	0.77	1.19	1.83	2.47	3.43	4.65	5.58
	60°	0.05	0.28	0.73	1.11	1.83	2.92	4.29	7.00	9.43	12.78
	90°	0.06	0.47	0.85	1.28	2.05	3.24	4.74	8.26	11.61	14.72
3/4"	15°	0.05	0.24	0.56	0.90	1.34	2.15	2.75	3.76	4.75	5.56
	30°	0.07	0.30	0.61	0.99	1.57	2.42	3.25	4.52	6.12	7.34
	60°	0.08	0.35	0.93	1.46	2.42	3.85	5.64	9.21	12.41	16.28
	90°	0.09	0.59	1.11	1.69	2.69	4.27	6.24	10.85	15.28	19.39
1"	15°	0.06	0.32	0.95	1.50	2.35	3.80	4.70	6.50	8.50	9.85
	30°	0.08	0.45	1.25	2.06	3.54	5.30	7.70	10.49	12.84	15.48
	60°	0.09	0.68	1.74	2.78	5.13	8.00	11.88	18.71	23.22	32.84
	90°	0.12	0.93	2.78	5.09	7.74	12.20	17.33	24.48	26.79	43.89
1-1/4"	15°	0.03	0.27	0.83	1.65	2.79	4.09	5.88	7.99	10.84	12.85
	30°	0.06	0.48	1.37	2.47	4.12	6.08	8.82	11.76	14.87	17.39
	60°	0.07	0.67	2.04	3.41	6.47	10.80	15.39	22.35	33.37	44.20
	90°	0.09	0.78	2.92	5.41	10.23	17.28	19.48	34.93	51.76	66.00
1-1/2"	15°	0.06	0.38	1.17	2.28	3.85	5.59	8.10	10.99	14.86	17.85
	30°	0.08	0.65	1.88	3.39	5.66	8.36	12.12	16.17	20.44	23.90
	60°	0.09	0.92	2.81	4.69	8.89	14.85	21.16	30.73	45.88	59.74
	90°	0.11	1.07	4.01	7.44	14.06	23.76	26.78	48.03	71.17	90.50
2"	15°	0.06	0.69	2.26	4.45	7.30	10.68	15.40	21.39	28.75	35.05
	30°	0.09	1.18	3.79	7.53	12.26	17.83	26.44	36.45	48.09	55.92
	60°	0.11	1.51	5.80	10.39	20.60	33.98	48.75	69.04	104.23	136.50
	90°	0.17	1.89	7.28	13.58	25.38	42.30	55.56	87.04	129.75	167.34
2-1/2"	15°	0.08	0.77	2.44	5.25	8.08	11.75	16.44	22.36	27.24	32.10
	30°	0.10	1.15	4.42	7.91	13.39	20.05	30.43	41.92	69.75	77.20
	60°	0.14	1.46	5.91	11.90	23.24	37.92	59.31	83.29	113.65	162.50
	90°	0.18	1.83	7.29	16.45	31.16	53.53	77.89	118.29	177.32	240.10
3"	15°	0.08	0.92	2.98	6.65	9.60	13.50	19.62	26.69	31.80	38.40
	30°	0.13	1.20	4.15	9.49	15.96	26.78	38.91	53.31	69.77	85.91
	60°	0.16	2.89	6.70	15.82	29.36	46.32	73.60	106.74	149.88	193.20
	90°	0.21	4.12	8.65	21.09	41.09	69.27	105.91	161.04	237.23	359.21
4"	15°	0.12	1.40	3.76	8.88	16.79	27.92	41.85	59.27	75.55	97.05
	30°	0.18	1.75	7.84	18.59	35.21	58.60	87.89	124.41	158.53	197.10
	60°	0.27	2.20	12.44	33.67	62.98	106.26	160.49	233.96	329.50	437.29
	90°	0.36	4.37	19.68	50.29	91.83	157.43	240.51	365.15	546.62	830.86
6"	15°	0.21	2.50	6.66	15.79	29.88	49.74	74.56	105.55	134.48	172.05
	30°	0.30	3.12	13.97	33.15	62.70	104.37	156.53	221.56	282.33	349.70
	60°	0.47	5.41	22.15	59.97	112.16	189.24	285.82	416.68	586.83	800.80
	90°	0.68	7.79	35.05	89.56	163.56	280.37	428.34	650.32	973.50	1480.08
8"	15°	0.34	4.25	11.33	26.86	50.80	84.60	126.88	195.08	345.80	497.52
	30°	0.50	5.32	23.77	56.35	106.70	177.62	266.39	377.06	480.47	595.20
	60°	0.80	6.66	23.81	102.06	190.87	322.06	486.41	709.11	998.69	1325.40
	90°	1.08	13.26	59.64	152.42	278.33	477.14	728.96	1106.69	1656.77	2518.20
FL		0.96	0.95	0.94	0.93	0.92	0.90	0.89	0.86	0.82	0.75
Xt		0.98	0.77	0.71	0.67	0.64	0.63	0.62	0.55	0.43	0.40

Sizing Recommendations

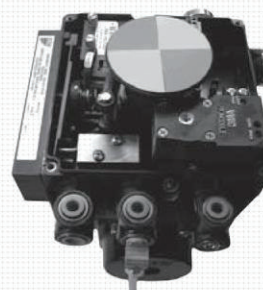
Control Valves work best in the rotary range of about 65°-75°. After computing the required C_v choose the valve that has a rated C_v (Full open) at least 20% larger than your calculated C_v.

Select the smallest valve possible for the application. Oversizing reduces the useful range in which the valve positioner will operate. Use the largest actuator feasible for the valve size chosen. This increases the positioning accuracy of the valve positioner.

Valve Flow Coefficient (C_v)

Number of U.S. gallons per minute of 60°F water that will flow through a valve with a one psi pressure drop. Ball Valves have an inherent equal percentage characteristic flow curve which is very desirable for a majority of control applications. The standard and full round port valves as well as V-Ports exhibit equal percentage characteristics.

Pneumatic & Electro-Pneumatic Positioners



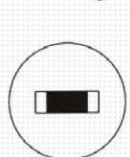
The V Series Positioner is designed for simple and precise positioning of single & double acting pneumatic rotary actuators. The V Series offers reliable economical operation performance with a 30 year proven track record. Available in 4-20 MA or 3-15 PSI

- Modular/totally field upgradeable
- Corrosion & Vibration resistant

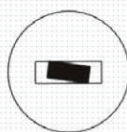
General Purpose Hazardous Location

MATCHED BALL AND STEM CONNECTION

Flo-Tite's Design



Competitors' Design



Matched Fit Provides More Precise Control

ENCAPSULATED COUPLERS

Precision machined to tight tolerances, completely encapsulates the valve stem to reduce any possible hysteresis while locking the actuator gear in place.



Model Standard Port VSF150/VSF300 VRF15/VRF30 VRF150/VRF300											
Valve Size	V Port Angle	Percent and Angle of Ball Rotation									
		10% 9°	20% 18°	30% 27°	40% 36°	50% 45°	60% 54°	70% 63°	80% 72°	90% 81°	100% 90°
3"	15°	0.05	0.56	1.90	4.20	6.00	8.60	12.28	16.74	19.96	24.58
	30°	0.06	0.75	2.60	5.95	10.00	16.13	23.51	36.63	55.22	81.58
	60°	0.08	0.95	4.20	9.91	18.40	29.02	46.12	66.88	93.91	121.08
	90°	0.09	1.20	5.45	13.21	25.75	43.41	66.23	100.91	148.65	225.00
4"	15°	0.06	0.23	1.58	2.50	4.56	8.25	11.96	18.68	27.95	41.58
	30°	0.08	0.44	1.89	4.62	9.18	16.13	23.51	36.63	55.22	81.76
	60°	0.11	1.03	4.59	11.34	24.68	37.37	54.47	84.86	127.91	189.91
	90°	0.15	1.85	8.27	20.41	37.05	66.98	98.04	150.50	230.34	340.87
6"	15°	0.07	0.34	2.27	3.58	6.52	11.80	17.18	26.75	40.12	59.58
	30°	0.10	0.64	2.71	6.62	13.17	23.14	33.74	52.56	79.23	117.28
	60°	0.16	1.47	6.59	16.27	34.41	53.61	78.15	121.75	183.52	272.50
	90°	0.24	2.66	11.86	29.28	53.16	96.09	140.67	215.93	330.48	489.00
8"	15°	0.16	0.76	5.26	8.35	15.25	27.40	39.88	62.04	93.40	138.35
	30°	0.24	1.48	6.29	15.39	30.59	53.77	78.38	122.11	184.07	272.47
	60°	0.35	3.45	15.30	37.79	82.27	124.55	181.38	282.85	426.36	633.00
	90°	0.47	6.18	27.55	68.02	123.50	223.25	326.80	501.66	767.79	1136.20
10"	15°	0.35	1.45	10.25	16.24	29.30	53.50	77.66	120.90	182.30	269.40
	30°	0.44	2.89	12.88	31.75	57.72	104.71	152.63	237.80	358.46	530.63
	60°	0.67	6.66	29.79	73.59	160.21	242.53	353.57	550.82	830.28	1232.90
	90°	0.89	12.03	53.65	240.50	434.75	636.40	976.91	976.91	1495.20	2212.78
12"	15°	0.60	2.80	19.75	31.20	56.60	102.80	149.40	232.60	350.50	520.20
	30°	0.80	5.56	24.79	61.12	111.11	201.57	293.81	457.77	690.04	1021.90
	60°	1.30	12.82	57.35	141.66	308.40	466.87	680.62	1060.33	1598.29	2373.30
	90°	1.73	24.10	104.30	465.10	838.10	1230.05	1565.10	1900.10	2880.10	4300.50
FL		0.96	0.95	0.94	0.93	0.92	0.90	0.89	0.86	0.82	0.75
Xt		0.98	0.77	0.71	0.67	0.64	0.63	0.62	0.55	0.43	0.40

Flo-Tite's V-Seat control valves are ideal for any application where critical high performance characterized flow is required.

Important Information Required to size control valves:

1. Type of media, ie liquid, gas or steam
2. What type of calculation
 - a, CV required given the rate through the valve
 - b, flow rate given the CV
3. Flow rate, GPM, PPH, SCFM
4. Inlet pressure of media to valve (PSIG)
5. Outlet pressure of media from valve (PSIG)
6. Inlet temperature of media at valve
7. Specific gravity of media at valve
8. Media vapor pressure (PSIG)
9. Media critical pressure
10. Pipe size to valve
11. Pipe size from valve

ROUND PORT BALL VALVE FLOW COEFFICIENT C_v CHARTS

Standard Port Models SF150 / SF300											
Valve Size	Percent and Angle of Ball Rotation										
	0% 0°	10% 9°	20% 18°	30% 27°	40% 36°	50% 45°	60% 54°	70% 63°	80% 72°	90% 81°	100% 90°
2"	0	0	1.5	10.0	22.5	36.6	52.4	70.7	87.0	105.0	124
2-1/2"	0	0	7.5	26.6	51.9	80.0	111.6	144.2	177.4	209.8	245
3"	0	0	11.9	40.5	78.0	121.0	167.9	217.0	266.6	314.9	364
4"	0	0	20.5	74.2	145.9	228.5	318.9	413.6	509.2	602.7	698
6"	0	3.5	56.8	139.6	243.6	361.4	488.3	619.6	750.8	877.7	995
8"	0	8.3	129.9	322.7	562.4	835.0	1128.3	1431.8	1735.3	2028.9	2309
10"	0	55.5	299.5	646.6	1065.0	1534.2	2033.9	2547.3	3057.8	3548.9	4000
12"	0	138.7	625.0	1299.2	2107.5	3005.0	3960.9	4939.3	5911.1	6844.4	7708

Full Port Models F150 / F300											
Valve Size	Percent and Angle of Ball Rotation										
	0% 0°	10% 9°	20% 18°	30% 27°	40% 36°	50% 45°	60% 54°	70% 63°	80% 72°	90% 81°	100% 90°
1/2"	0	0	0	0.7	3.9	8.0	12.9	17.6	24.3	29.6	34
3/4"	0	0	0	2.6	7.9	14.5	21.7	29.7	38.0	46.2	57
1"	0	0	1.3	8.9	19.4	32.7	46.8	61.9	77.0	92.6	105
1-1/4"	0	0	5.8	20.7	41.3	65.6	91.9	119.3	147.2	174.5	208
1-1/2"	0	0	3.6	22.7	50.7	83.9	120.8	159.7	199.4	238.4	277
2"	0	0	15.5	54.8	106.6	166.8	232.0	300.4	369.5	437.0	510
2-1/2"	0	0	25.8	87.6	168.6	262.5	363.9	470.2	577.5	682.3	785
3"	0	0	33.8	123.7	242.7	380.8	531.5	689.3	848.7	1004.5	1155
4"	0	7.6	118.9	296.2	516.2	766.5	1035.8	1314.3	1592.7	1861.8	2115
6"	0	40.5	224.3	631.8	1149.9	1746.3	2392.5	3064.2	3738.8	4393.3	5050
8"	0	63.7	600.7	1416.3	2418.3	3552.3	4768.2	6023.1	7275.9	8485.1	9640
10"	0	184.2	1085.2	2381.6	3950.9	5712.4	7591.5	9523.9	11447.0	13298.4	15000
12"	0	140.0	1320.0	3048.2	5290.0	7775.5	10434.0	13200.6	15940.2	18570.1	21060

Flow Characteristics

Appropriate flow characteristics for control elements will be determined by application:

Linear - slotted seats from

0.0156", 0.0313", 0.0625" and 0.1250" or any combination conforming to customer's requirement.

Equal % - Triangular shape of 15°, 30°, 60°, 90°, and 120° are available with special combinations for custom flows.



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