SVF Flow Controls
INCORPORATED

13560 Larwin Circle, Santa Fe Springs, Ca. 90670
(800) 783-7836 (562) 802-2255
Fax (562) 802-3114
NetSite www.SVF.net
E-mail Sales @ SVF.net

V7 SERIES

CONTROL BALL VALVES

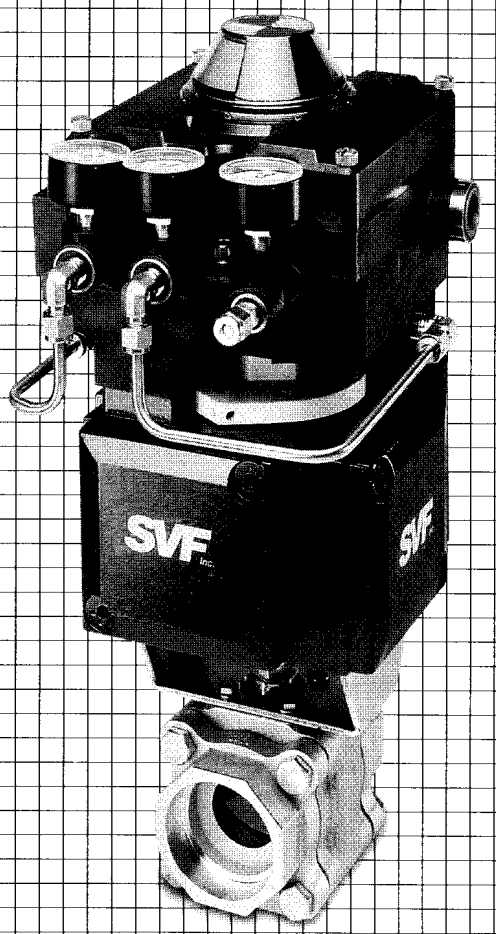
Size Range:
1/2" - 1" - 2"

End Connections:
NPT
Buttweld
Socket Weld
150# - 300# - 600#
Flanged
Sanitary

Valve Material:
316 Stainless Steel

Service Applications:
Hydraulics
Steam
Oxygen
Vacuum
Thermal Fluids
Chemical
Oil/Gas
Food Processing
Dry/Liquid Chlorine

Upstream Seat Materials:
NRG
Delrin
VXI
Tempre K (PEEK)
UHMWPE



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SVF V-SEAT CONTROL VALVES

SVF V-Seat Control Valves are ideal for any application where critical, high performance characterized flow is required.

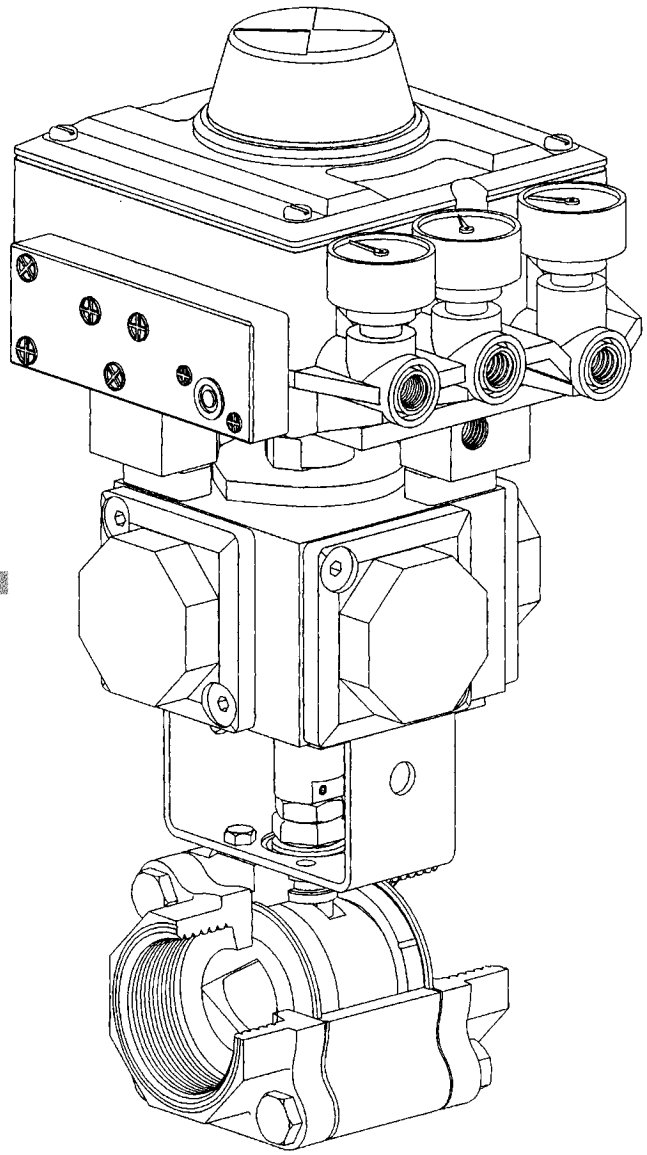
The modular V-Seats are adapted to our well proven, high performance ball valves to provide accurate control of gases, liquids and slurries and may be selected for equal percentage, linear or customized flow.

With a wide choice of advanced technology seat materials, V-Seat control valves may be used in a variety of critical application including:

- Temperature Control - Steam and Heat Transfer Fluids, Hot Gases and Air Conditioning.
- pH Control
- Flow Control
- Level Control
- Pressure Control
- Liquids containing solids and fibrous medias

DYNAMIC CHARACTERISTICS

Shutoff	Class VI+ (Lapped Ball & Seat)
Capacity	2" Cv = 51
Stem Leakage	Pre-loaded / EPA Design
Rangeability	200:1
Slurry	Shearing Action Handles Slurries
Fugitive Emission	Rotary Stem is inherently resistant to wear
Vibration	Inherent, two-stage flow control minimizes vibration and eliminates dynamic resonance

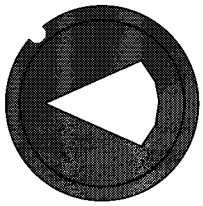


HIGH PERFORMANCE V-SEAT DESIGN

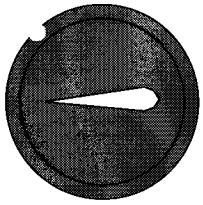
V-Seat Material	Forged 316 Stainless Steel
Pressure Drop	Up to 100 psi
Temperature	Up to 450° F
Inherent Characteristics	Equal Percentage, Linear
End Connections	NPT, SE, BW, Planned, Sanitary
Sizes	1/2", 1", 2"

Characterized Seat Control Valve

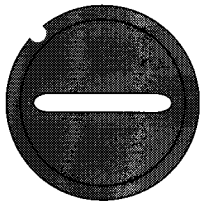
SVF Flow Controls manufactures a complete line of V-seat and Slotted seat control valves providing precision throttling control for a wide range of applications. As with our standard ball valves, V-characterized seated valves offer equal percentage flow characteristics. The slotted seated valves have an inherent linear flow characteristic.



60° V



30° V



Slot

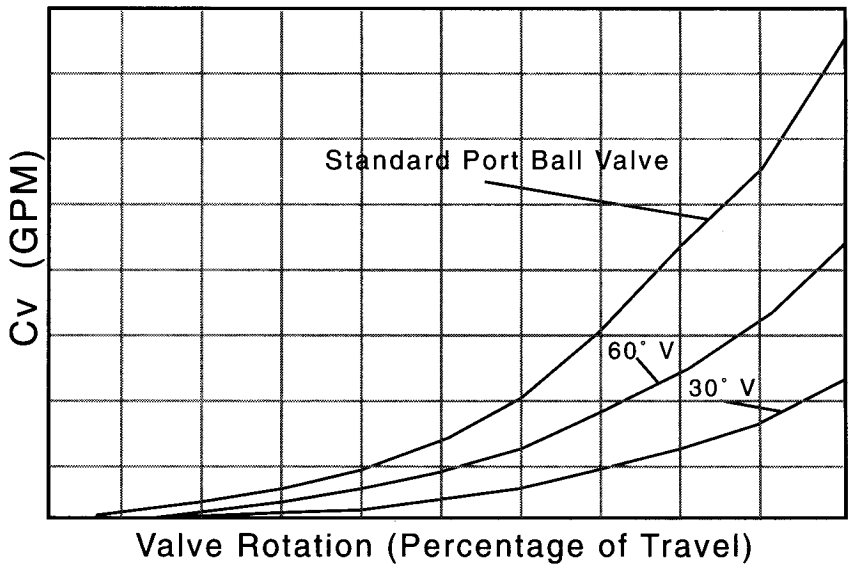
Advantages of the V-Seat Design

- Simplicity - Very low maintenance costs compared to globe and segmented ball valves
- Tight Shutoff - Exceeding Class VI and bubbletight
- High Rangeability - Repeatable control through 95% travel
- Low Cost - Purchase price is substantially lower than competitive high pressure drop valve
- Low weight - about 30% lighter than globe control valve
- Compact Size - Leaves more room for additional field equipment
- Shearing Action - Non-clogging control of fibers and solids
- Low Flow Control - Cv as low as 0.07
- Flexible Cv - Interchangeable seat angles or slots
- Erosion Resistant - Extra tough, hardened seat and ball
- High Pressure Drop - Liquids up to 500 psi, steam up to 150 psi
- High Temperature - Up to 1,000°F

The Cv graph shows the range of flow for the standard port, 60°V and 30°V ball valves. The characterized V seats provide finer control than round port valves. A typical comparison for a 1" valve is given below.

Maximum Flow Rates (Cv) For 1" Valves

Full Port	57
Reduced Port	32
60° V	14.8
30° V	5.5
Slot	3.7



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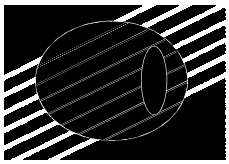

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Flow Coefficient

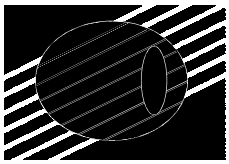
V7 Series, 3-Piece & V31 Characterized Seat Control Valves

Valve Size	Line Size	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1/2" Slot 1/32"	1/2"	0	0.02	0.03	0.07	0.12	0.16	0.20	0.24	0.28	0.32	0.36
	3/4"	0	0.02	0.03	0.07	0.10	0.14	0.18	0.21	0.25	0.29	0.32
	1"	0	0.02	0.03	0.06	0.10	0.13	0.16	0.18	0.21	0.27	0.30
1/2" Slot 1/16"	1/2"	0	0.02	0.07	0.20	0.33	0.46	0.60	0.73	0.86	0.99	1.10
	3/4"	0	0.02	0.06	0.18	0.29	0.41	0.53	0.65	0.77	0.88	0.98
	1"	0	0.02	0.06	0.17	0.27	0.38	0.50	0.61	0.71	0.82	0.91
1/2" V30	1/2"	0	0.02	0.10	0.20	0.34	0.55	0.83	1.11	1.59	2.08	2.50
	3/4"	0	0.02	0.09	0.18	0.30	0.49	0.74	0.99	1.41	1.85	2.22
	1"	0	0.02	0.08	0.17	0.28	0.46	0.69	0.92	1.32	1.73	2.07
1/2" V60	1/2"	0	0.02	0.12	0.33	0.90	0.84	1.35	1.95	3.10	4.37	5.92
	3/4"	0	0.02	0.10	0.29	0.44	0.75	1.20	1.74	2.76	3.90	5.27
	1"	0	0.02	0.10	0.27	0.41	0.70	1.12	1.62	2.57	3.63	4.91
1" Slot 1/32"	1"	0	0.02	0.06	0.14	0.22	0.29	0.37	0.45	0.53	0.60	0.68
	1-1/2"	0	0.02	0.06	0.13	0.19	0.26	0.33	0.40	0.47	0.54	0.61
	2"	0	0.02	0.05	0.12	0.18	0.24	0.31	0.33	0.39	0.50	0.57
1" Slot 1/16"	1"	0	0.02	0.13	0.38	0.63	0.87	1.14	1.39	1.63	1.88	2.09
	1-1/2"	0	0.02	0.11	0.34	0.55	0.78	1.01	1.23	1.46	1.67	1.86
	2"	0	0.02	0.11	0.32	0.51	0.72	0.95	1.16	1.35	1.56	1.73
1" V30	1"	0	0.02	0.21	0.56	0.96	1.58	2.39	3.43	4.62	6.15	7.26
	1-1/2"	0	0.02	0.16	0.44	0.75	1.23	1.86	2.68	3.60	4.80	5.66
	2"	0	0.02	0.15	0.40	0.69	1.14	1.72	2.47	3.33	4.43	5.23
1" V60	1"	0	0.02	0.30	0.78	1.24	2.27	3.59	5.28	8.29	11.60	15.50
	1-1/2"	0	0.02	0.23	0.61	0.97	1.77	2.80	4.12	6.47	9.05	12.10
	2"	0	0.02	0.22	0.56	0.89	1.63	2.58	3.80	5.97	8.35	11.20

Cv is defined as the flow of water at 60 Degrees F. in gallons per minute through a valve with a pressure drop of 1 psi across the valve.

F_L	0	0.96	0.95	0.94	0.93	0.92	0.90	0.88	0.86	0.82	0.75
Xt	0	0.98	0.77	0.71	0.67	0.64	0.63	0.62	0.55	0.43	0.40

F_L = Liquid Pressure Recovery Factor Xt = Pressure Drop Ratio Factor (Gas)



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Flow Coefficient

V7 Series, 3-Piece & V31 Characterized Seat Control Valves

Valve Size	Line Size	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
2" V30	2"	0	0.02	0.55	1.72	3.41	5.65	8.26	12.10	16.60	22.20	26.50
	3"	0	0.02	0.45	1.41	2.80	4.63	6.77	9.92	13.60	18.20	21.70
	4"	0	0.02	0.41	1.27	2.52	4.18	6.11	8.95	12.30	16.40	19.60
2" V60	2"	0	0.02	0.70	2.64	4.90	9.32	15.50	22.20	32.10	47.20	61.60
	3"	0	0.02	0.57	2.16	4.02	7.64	12.70	18.20	26.30	38.70	50.50
	4"	0	0.02	0.52	1.95	3.63	6.90	11.50	16.40	23.80	34.90	45.60
2" V90	2"	0	0.02	0.88	3.30	6.13	11.65	19.40	27.50	40.10	59.00	77.00
	2 1/2"	0	0.02	0.79	2.94	5.46	10.39	17.27	24.48	35.69	52.51	68.53
	3"	0	0.02	0.73	2.74	5.09	10.37	17.27	22.83	33.28	48.97	63.91
2" V120	2"	0	0.02	1.86	5.25	10.30	15.80	25.30	37.10	59.50	91.80	110.80
3" V30	3"	0	0.02	0.75	2.68	6.00	10.20	16.90	24.50	33.90	44.80	54.20
	4"	0	0.02	0.54	1.93	4.32	7.34	12.20	17.60	24.40	32.30	39.00
	6"	0	0.02	0.41	1.47	3.30	5.61	9.30	13.50	18.60	24.60	29.80
3" V60	3"	0	0.02	0.95	4.25	10.10	18.60	29.40	46.30	67.20	94.40	124.60
	4"	0	0.02	0.68	3.06	7.27	13.40	21.20	33.30	48.40	68.00	89.70
	6"	0	0.02	0.52	2.34	5.56	10.20	16.20	25.50	37.00	51.90	68.50
4" V30	4"	0	0.02	0.80	3.59	8.50	16.10	26.80	40.20	56.60	72.50	89.80
	6"	0	0.02	0.52	2.33	5.53	10.50	17.40	26.10	36.80	47.10	58.40
	8"	0	0.02	0.44	1.97	4.68	8.86	14.70	22.10	31.10	39.90	49.40
4" V60	4"	0	0.02	0.90	5.69	15.40	28.80	48.60	73.40	107.00	150.70	200.00
	6"	0	0.02	0.59	3.70	10.00	18.70	31.60	47.70	69.60	98.00	130.00
	8"	0	0.02	0.50	3.13	8.47	15.80	26.70	40.40	58.90	82.90	110.00

Cv is defined as the flow of water at 60 Degrees F. in gallons per minute through a valve with a pressure drop of 1 psi across the valve.

F_L	0	0.96	0.95	0.94	0.93	0.92	0.90	0.88	0.86	0.82	0.75
Xt	0	0.98	0.77	0.71	0.67	0.64	0.63	0.62	0.55	0.43	0.40

F_L = Liquid Pressure Recovery Factor Xt = Pressure Drop Ratio Factor (Gas)

Control Valve Terms and Formulas

Capacity:

Rate of flow through a valve under stated conditions.

"Rated Capacity" is the flow through a valve in the full open position.

Characterized Seat:

A seat design for ball valves that determines the flow characteristics of the valve. Different seat "shapes" will effect the flow rate, capacity and inherent flow curves.

Control Valve:

A final controlling element (through which a fluid passes) which adjusts the size of the flow passage as directed by a signal from a controller to modify the rate of flow of the fluid.

Equal Percentage Flow Characteristic:

An inherent flow characteristic which, for equal increments of rated travel, will ideally give equal percentage changes of the existing flow.

Linear Flow Characteristic:

An inherent flow characteristic which, for equal increments of rated travel, will ideally give equal increments of flow at a constant pressure drop.

Positioner:

A control valve accessory that senses an instrument signal, compares it to the valve position and then supplies the necessary air pressure to the actuator to compensate for the signal/position difference.

Rangeability:

The ratio of the maximum flow coefficient to the minimum useful flow coefficient of a control valve.

Quick Opening Flow Characteristic:

Inherent flow characteristic in which there is maximum flow with minimum travel.

Recovery:

Ratio of maximum (fully open) downstream pressure to upstream pressure. A ball valve dissipates little flow stream energy due to streamlined internal contours and is considered a High Recovery Valve.

Valve Flow Coefficient (Cv):

Number of U.S. gallons per minute of 60°F water that will flow through a valve with a 1 psi pressure drop under stated conditions. See discussion below.

Ball Valves In Control Applications

Ball valves have an inherent equal percentage characteristic flow curve which is very desireable for a majority of control applications.

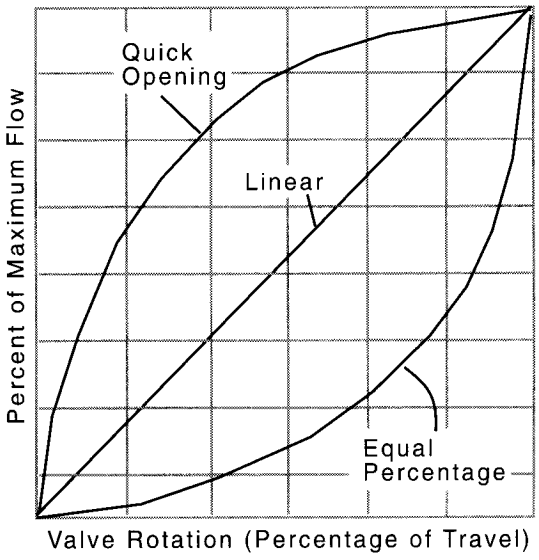
The standard and full port valves as well as the characterized V30 and V60 seats exhibit equal percentage characteristics while the characterized "Slot" seat exhibits a linear flow curve.

Most valve positioners are supplied with a linear response (ie: 50% signal yields 50% rotary position) which means that in control applications the control valve package will have the same response inherent in the valve.

Other reasons that ball valves are used in control applications:

Rotary design is easy to automate
Package is light weight and simple to repair
Ball valves are considered High Recovery Valves
They are available with characterized seats for critical control requirements

Typical Control Curves



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Control Valve Terms and Formulas (continued)

Valve Sizing - Liquid

The Cv formula shown below is ideal for sizing and selecting a vast majority of valves for liquid service.

$$Cv = Q\sqrt{G / dP}$$

Where:

Q = Capacity in gallons per minute
dP = Pressure differential in psi
G = Specific gravity of fluid
(water at 60°F = 1.00)

Example-

Line Size:	1"
Media:	Water (G=1)
Pressure Differential (dP):	25psi
Flow Rate (Q):	22 GPM

$$Cv = Q\sqrt{G / dP}$$

$$Cv = 22\sqrt{1 / 25}$$

$$Cv = 22\ (0.2\ )$$

$$Cv = 4.4$$

Rated Cv = 4.4 (1.2) = 5.3 **

Valve Sizing - Gas

The Cv formula shown below is ideal for sizing and selecting a vast majority of valves for steam service.

$$Cv = \frac{W}{2.1\sqrt{dP(P1 + P2)}}$$

Where:

W = Flow rate in pounds per hour
dP = Pressure differential in psi
P1 = Upstream pressure, psia
P2 = Downstream pressure, psia

Example-

Line Size:	2"
Media:	Steam
Pressure Differential (dP):	50
Flow Rate (W):	4,000 Pounds per hour
P1:	150
P2:	100

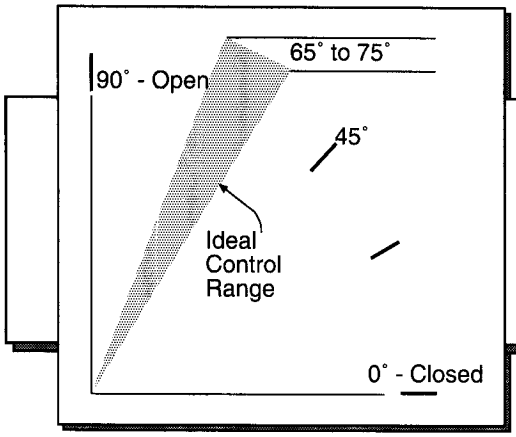
$$Cv = \frac{W}{2.1\sqrt{dP(P1 + P2)}}$$

$$Cv = \frac{4000}{2.1\sqrt{50(150 + 100)}}$$

$$Cv = \frac{4000}{2.1\ (111)}$$

$$Cv = 17.16$$

Rated Cv = 17.16 (1.2) = 20.59**



**Control valves work best in the rotary range of about 65° - 75°.

After computing the required Cv choose the valve that has a Rated Cv (Full Open) at least 20% larger than your computed Cv.

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