Building connections that last™

ASC Engineered Solutions

Sharpe® Series V84

High Performance Three-Piece Ball Valve Datasheet

SHARPE
An ASC Engineered Solution

Design and Features:

Body Material

316 Stainless Steel & Carbon Steel

Three-Piece Design

In-line serviceable swing-out center section allows easy access to internal valve components without disturbing alignment of pipe.

Stem Design

Live-loaded, bottom entry, blowout proof, anti-static stem featuring packing that extends valve cycle life over conventional ball valves and is best choice for actuation.

Stem seals are live-loaded using Belleville springs to provide consistent sealing forces, reducing or eliminating the need for frequent seal adjustment.

Tongue and Groove Design

Fully encapsulated body seals, allowing ends to be welded in-line, without time consuming and labor intensive disassembly.

Design compensates for bolt expansion and reduces the chance of external leakage.

Helps prevent seal ruptures in high pressure, cryogenic or steam applications.

Floating Ball Design

Precision engineered and machined solid stainless steel ball with relief hole in the stem slot prevents build-up of cavity pressure while the valve is open.

Encapsulated Body Bolts

Heavy duty stainless steel bolting is protected from outside environment assuring valve integrity.

Ideal for wash-downs.

Slotted Seat Design

Relief slots help equalize body pressure and assure leak-tight sealing. Seats also provide a wiping action that cleans ball and seats each time valve is cycled.

Choice of Seats and Seals

A wide variety of seat and seal materials are readily available for the most demanding applications including; TFE, RTFE, TFM™, Nova, Delrin®, PEEK, EPDM and Viton®.

Variety of End Combinations

A wide choice of end connections are available including, but not limited to; threaded, socket weld, butt weld, flanged and flush bottom tank pad ends.

ISO 5211 Integral Mounting Pad

Ideal for actuation.

Centering lip feature assures precise alignment of bracket, stem and coupler.

Actuators may be retrofitted on existing Sharpe® Series V84 without disruption of line integrity.

Allows for secondary containment unit to be added when necessary.

V Port Balls

The Sharpe® Series V84 utilizes characterized V ported balls permitting the use of soft seats to achieve a class VI shut off.

No Play Coupler

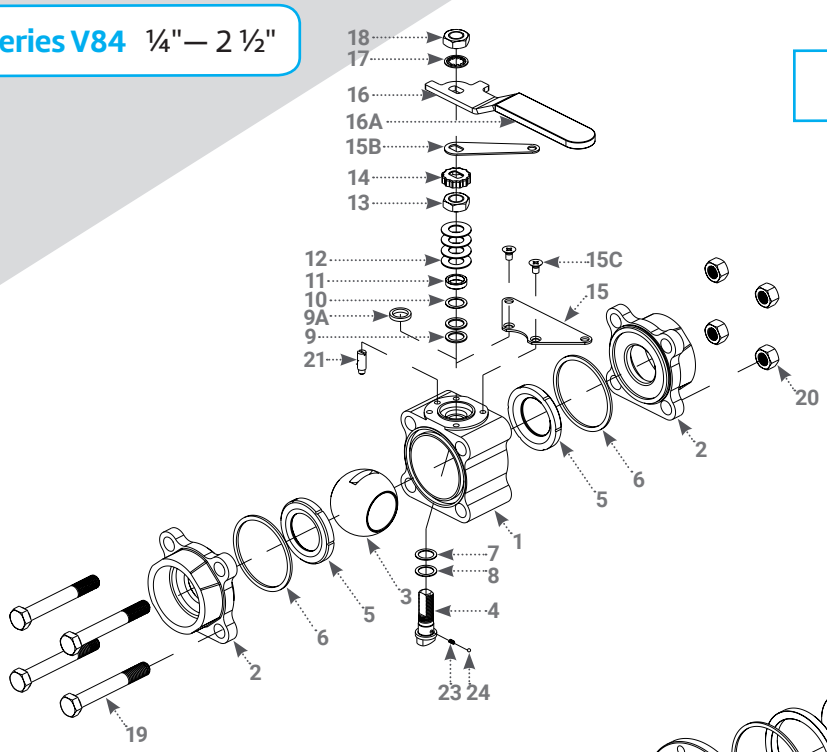
Minimizes hysteresis between valve stem and actuator.

Traceability

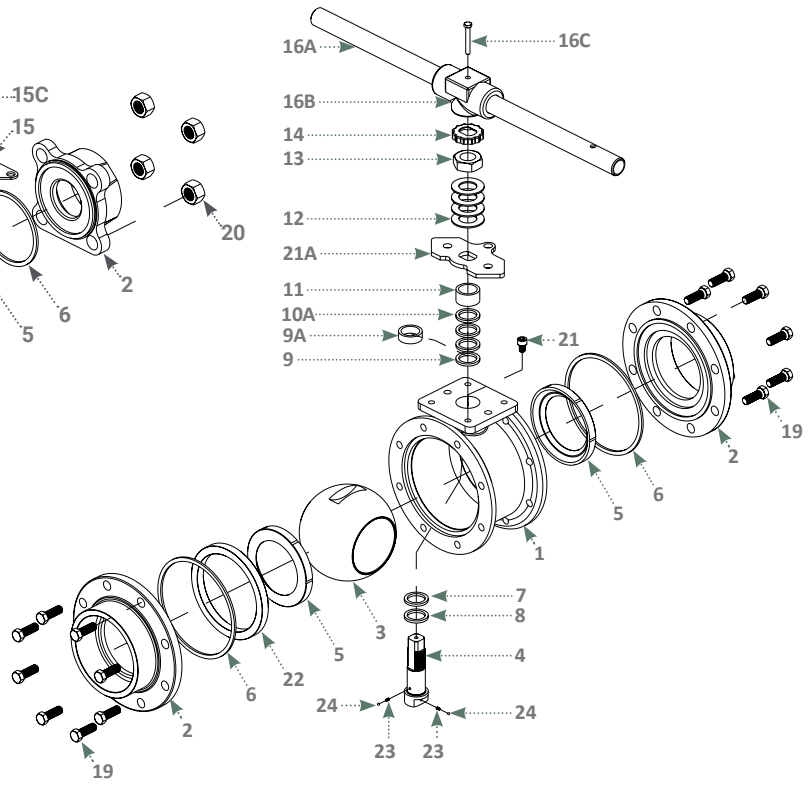
Body and end piece castings are marked with heat codes providing traceability to the chemical analysis and material test reports performed at the foundry. CMTR's (Certified Material Test Reports) are available upon request.

High Performance Three-Piece Ball Valve
Sharpe® Series V84

Series V84 ¼"— 2 ½"



Series V84 3"— 4"



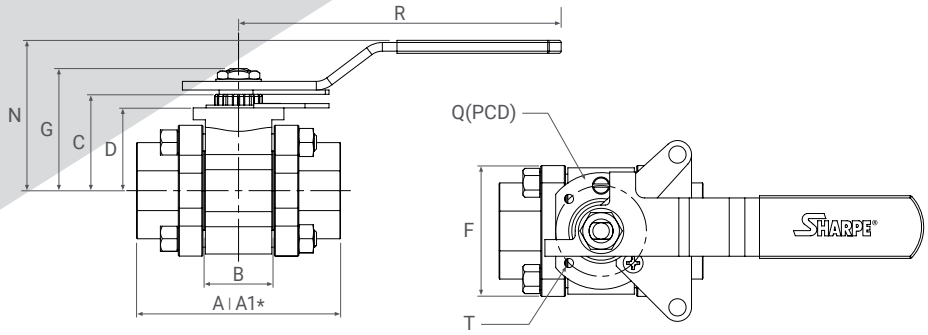
Parts & Materials

No.	Part Name	Qty.	Material
1	Body	1	316 Stainless Steel ASTM A351 CF8M Carbon Steel ASTM A216 WCB
2	Ends	2	316L Stainless Steel ASTM A351 CF3M Carbon Steel ASTM A216 WCB
3	Ball	1	316 Stainless Steel
4	Stem	1	316 Stainless Steel 17-4PH
5	Seat	2	PTFE, TFM™ UHMWPE RTFE, Nova, PEEK, Delrin®
6	Body Seal	2	PTFE, Graphite, UHMWPE, Buna, Viton®
7	Thrust Bearing	1	Nova (UHMWPE with UHMWPE Seats)
8	Thrust Bearing	1	PEEK (UHMWPE with UHMWPE Seats)
9	Stem Packing	2	Nova (UHMWPE with UHMWPE Seats)
9A	Stem Packing	1-2	Graphite
10	Seat Protector	1	PEEK
10A	Washer	1	316 Stainless Steel
11	Gland	1	300 Series Stainless Steel
12	Belleville Washer	4	300 Series Stainless Steel
13	Packing Nut	1	300 Series Stainless Steel

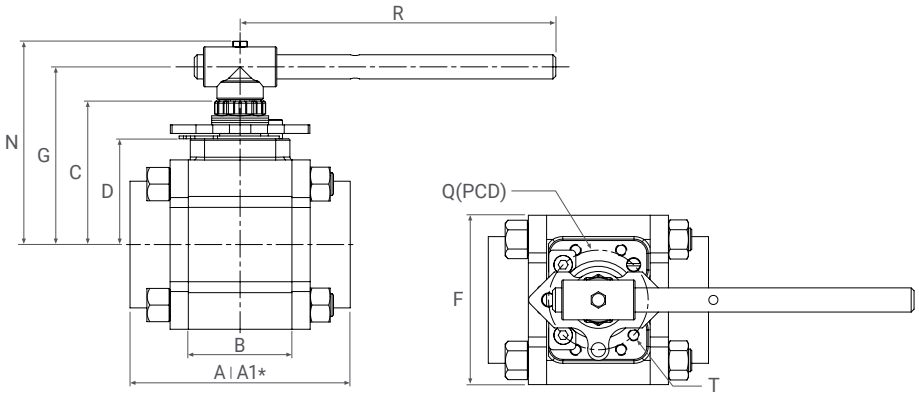
No.	Part Name	Qty.	Material
14	Lock Tab	1	300 Series Stainless Steel
15	Lower Lock Latch	1	300 Series Stainless Steel
15B	Upper Lock Latch	1	300 Series Stainless Steel
15C	Latch Bolt	2	300 Series Stainless Steel
16	Handle (¼"- 2")	1	300 Series Stainless Steel
16A	Wrench (3" & 4")	1	Galvanized
16B	Wrench Block	1	300 Series Stainless Steel
16C	Hex Head Bolt	1	300 Series Stainless Steel
17	Lock Washer	1	300 Series Stainless Steel
18	Handle Nut (¼"- 2")	1	300 Series Stainless Steel
19	Body Bolts	4/16	304 Stainless Steel
19A	Body Connector Bolt	4	300 Series Stainless Steel
20	Nuts	8	300 Series Stainless Steel
21	Stop Pin	1	300 Series Stainless Steel
21A	Stopper	1	300 Series Stainless Steel
22	Seat Retainer	1	300 Series Stainless Steel Carbon Steel
23	Anti-Static Spring	1	Hard Drawn Stainless Steel
24	Anti-Static Ball	1	300 Series Stainless Steel

Dimensions

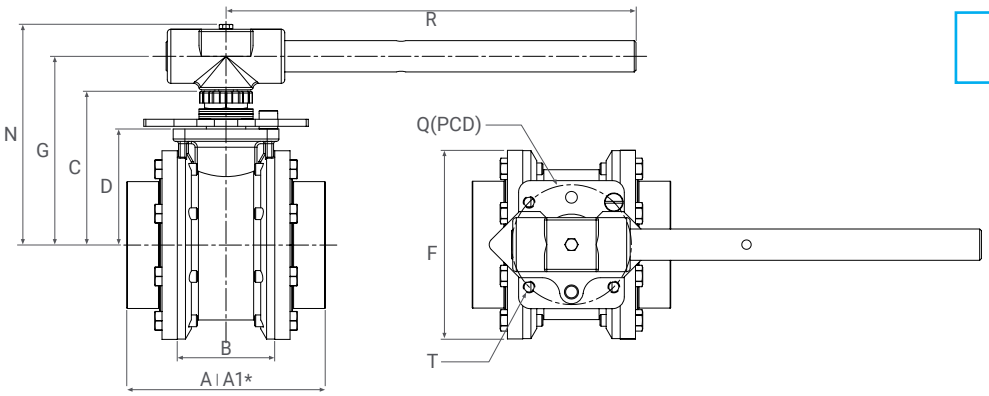
Series V84 ¼"— 2"



Series V84 2½"



Series V84 3" – 4"



Dimensions

V84	A	B	C	D	F	G	L	M	N	Ø Q (ISO)	R	T	V
¼", ⅜", ½"	2.62	0.82	1.32	1.06	1.81	1.58	⅜"-24 UNF	0.220	2.15	1.42 (F03)	4.53	M5 x P0.8	0.31
¾"	2.87	0.97	1.27	1.13	1.94	1.65	⅜"-24 UNF	0.220	2.28	1.42 (F03)	4.53	M5 x P0.8	0.35
1"	3.72	1.25	1.73	1.51	2.38	2.23	7/16"-20 UNF	0.295	2.70	1.65 (F04)	5.79	M5 x P0.8	0.52
1¼"	4.25	1.61	1.90	1.70	2.78	2.43	7/16"-20 UNF	0.295	2.89	1.65 (F04)	5.79	M5 x P0.8	0.53
1½"	4.58	1.90	2.17	1.73	3.12	2.90	9/16"-18 UNF	0.342	3.15	1.97 (F05)	6.78	M6 x P1.0	0.73
2"	5.03	2.21	2.39	1.90	3.60	3.09	9/16"-18 UNF	0.342	3.37	1.97 (F05)	6.78	M6 x P1.0	0.73
3"	6.65	3.27	5.01	3.89	6.46	6.14	1" - 14 UNS	0.748	6.14	4.02 (F10)	13.74	M10 x P1.5	0.69
4"	8.43	4.29	5.60	4.48	8.00	6.73	1" - 14 UNS	0.748	7.81	4.02 (F10)	13.74	M10 x P1.5	0.69

Note: The dimensions above are for informational purpose only. Please refer to Sharpe® Valves if you need dimensions for construction.

Technical Information

Control Valve Cv Values

Valve Size	Valve Percent Open (Degree of Rotation)										
	0 (0)	10 (9)	20 (18)	30 (27)	40 (36)	50 (45)	60 (54)	70 (63)	80 (72)	90 (81)	100 (90)
¼" – ½" – V15		0.05	0.14	0.25	0.37	0.51	0.66	0.84	1.03	1.26	1.36
¼" – ½" – V30		0.05	0.15	0.29	0.48	0.65	0.91	1.30	1.60	2.03	2.19
¼" – ½" – V60		0.11	0.28	0.55	0.80	1.17	1.72	2.45	3.43	4.48	5.18
¾" – V15		0.12	0.26	0.41	0.58	0.80	1.05	1.32	1.65	1.93	2.02
¾" – V30		0.13	0.29	0.50	0.80	1.09	1.50	2.03	2.61	3.11	3.31
¾" – V60		0.21	0.44	0.80	1.28	1.91	2.77	3.70	5.33	6.71	7.31
1" – V15		0.13	0.36	0.63	0.90	1.33	1.84	2.37	2.97	3.53	3.78
1" – V30		0.14	0.41	0.77	1.27	2.01	2.83	3.87	5.03	6.08	6.66
1" – V60		0.25	0.69	1.34	2.31	3.59	5.34	7.55	10.29	13.28	15.04
1–½" – V15		0.29	0.66	1.17	1.86	2.70	3.69	4.71	5.82	7.02	7.89
1–½" – V30		0.33	0.88	1.75	2.89	4.42	6.23	8.31	9.97	12.19	13.91
1–½" – V60		0.56	1.64	3.16	5.33	8.45	11.33	15.67	22.18	28.19	32.08
2" – V15		0.39	0.93	1.79	2.74	3.97	5.37	6.68	8.28	9.51	10.81
2" – V30		0.40	1.18	2.21	3.88	6.09	8.44	10.91	14.08	17.25	19.49
2" – V60		0.71	2.22	4.48	7.26	10.50	15.72	21.52	29.38	37.46	43.54
3" – V15		0.66	1.94	3.69	6.12	9.01	11.97	15.50	19.40	23.59	27.05
3" – V30		0.72	2.56	5.49	8.99	13.51	19.68	26.45	34.29	42.85	52.41
3" – V60		1.65	5.32	10.98	18.95	29.77	43.94	60.07	81.37	106.13	131.43
4" – V15		0.97	2.97	5.82	9.35	13.56	18.60	24.24	30.51	37.44	44.27
4" – V30		1.50	4.81	9.56	16.67	25.43	35.19	47.06	60.69	77.20	91.66
4"– V60		2.57	8.33	18.61	30.01	47.66	70.85	98.75	133.52	174.99	215.11

Note:
C_V is defined as the flow of liquid in gallons per minute through a valve with pressure drop of 1 psi across the valve.

Factor	Valve Percent Open (Degree of Rotation)										
	0 (0)	10 (9)	20 (18)	30 (27)	40 (36)	50 (45)	60 (54)	70 (63)	80 (72)	90 (81)	100 (90)
F_L	0	0.96	0.95	0.94	0.93	0.92	0.90	0.88	0.86	0.82	0.75
X_t	0	0.98	0.77	0.71	0.67	0.64	0.63	0.62	0.55	0.43	0.40

Note:
F_L– Liquid Pressure Recovery Factor.
X_t– Pressure Drop Ratio Factor (Gas).

Technical Information

Flow Efficient – C_V – Standard Seat Control Valve – Round Port

Valve Size	Valve Percent Open (Degree of Rotation)										
	0 (0)	10 (9)	20 (18)	30 (27)	40 (36)	50 (45)	60 (54)	70 (63)	80 (72)	90 (81)	100 (90)
¼" - ½"	0	0.15	0.29	0.46	0.70	1.09	1.76	2.60	4.30	6.40	8.00
¾"	0	0.21	0.43	0.70	1.05	1.62	2.64	4.00	6.40	9.60	12.00
1"	0	0.58	1.15	1.90	2.80	4.30	7.00	10.50	17.00	26.00	32.00
1-½"	0	1.48	2.95	4.75	7.20	11.00	18.00	27.00	44.00	65.50	80.00
2"	0	2.16	4.33	6.95	10.50	16.20	26.40	39.60	64.0	96.00	120
3"	0	6.40	12.60	20.20	31.10	47.40	77.80	1151	87	280	350
4"	0	13.10	26.00	42.10	63.10	97.20	159	238	385	575	720

Note:
C_V is defined as the flow of liquid in gallons per minute through a valve with pressure drop of 1 psi across the valve.

Valve Size	Valve Percent Open (Degree of Rotation)										
	0 (0)	10 (9)	20 (18)	30 (27)	40 (36)	50 (45)	60 (54)	70 (63)	80 (72)	90 (81)	100 (90)
F_L	0	0.92	0.91	0.91	0.90	0.86	0.86	0.72	0.65	0.61	0.50
X_t	0	0.78	0.74	0.71	0.67	0.62	0.56	0.49	0.38	0.26	0.15

Note:
F_L – Liquid Pressure Recovery Factor.
X_t – Pressure Drop Ratio Factor (Gas-Choked Flow).

"No Play" Coupling

- 304 Stainless Steel Two-Piece Coupling
- Designed for Process Control Critical High Cycle Automated Valves
- No Hysteresis or Lost Motion



Basic Flow Equations for Liquid Service

Pipe Reducer Coefficients

Loss Coefficients

$$K1 = 0.5 \cdot \left[1 - \left[\frac{d}{D1}\right]^2\right]^2$$

$$K2 = \left[1 - \left[\frac{d}{D2}\right]^2\right]^2$$

Bernoulli Coefficients

$$Kb1 = 1 - \left[\frac{d}{D1}\right]^4$$

$$Kb2 = 1 - \left[\frac{d}{D2}\right]^4$$

Summation

$$\Sigma K = K1 + K2 + Kb1 - Kb2$$

Pipe Geometry (Reducer) Factor

$$Fp = \left[\left[\frac{Cv^2 \cdot \Sigma K}{890 \cdot d^4}\right] + 1\right]^{-.5}$$

Basic Flow Equations

Flow Rate

$$q = Fp \cdot Cv \cdot \left[\frac{\Delta P}{G}\right]^{.5}$$

$$w = 63.3 \cdot Fp \cdot Cv \cdot (\Delta P \cdot \gamma)^{.5}$$

Pressure Drop

$$\Delta P = G \cdot \left[\frac{q}{Fp \cdot Cv}\right]^2$$

$$\Delta P = \frac{1}{4010 \cdot \gamma} \cdot \left[\frac{w}{Fp \cdot Cv}\right]^2$$

Flow Coffecient

$$Cv = \frac{q}{Fp} \cdot \left[\frac{G}{\Delta P}\right]^{.5}$$

$$Cv = \frac{w}{63.3 \cdot Fp \cdot (\Delta P \cdot \gamma)^{.5}}$$

Nomenclature

Cv	=	Valve flow capacity coefficient
d	=	Valve inside diameter (in)
D1	=	Inside diameter of upstream pipe (in)
D2	=	Inside diameter of downstream pipe (in)
Fp	=	Piping geometry factor, dimensionless
K1	=	Pressure loss coefficient for inlet reducer, dimensionless
K2	=	Pressure loss coefficient for outlet reducer, dimensionless
Kb1	=	Pressure change (Bernoulli) coefficient for inlet reducer, dimensionless
Kb2	=	Pressure change (Bernoulli) coefficient for outlet reducer, dimensionless
G	=	Specific gravity of liquid relative to water at 70°F
ΔP	=	Pressure drop across the valve, or valve / reducer assembly (psi)
q	=	Volumetric flow rate, US gpm
w	=	Weight flow rate, lb/hr
γ	=	Weight density of liquid lb/ft^3

Basic Flow Equations for Gas and Vapor Service

Flow Rate

$$q = 1360 \cdot Fp \cdot Cv \cdot P1 \cdot Y\left[\frac{x}{G \cdot T \cdot Z}\right]^{.5}$$

$$w = 63.3 \cdot Fp \cdot Cv \cdot Y(x \cdot P1 \cdot \gamma 1)^{.5}$$

Pressure Drop

$$\Delta P = \frac{G \cdot T \cdot Z}{P1} \cdot \left[\frac{q}{1360 \cdot Fp \cdot Cv \cdot Y}\right]^{2}$$

$$\Delta P = \frac{1}{\gamma 1} \cdot \left[\frac{w}{63.3 \cdot Fp \cdot Cv \cdot Y}\right]^{2}$$

Flow Capacity Coefficients

$$CV = \frac{q}{1360 \cdot Fp \cdot P1 \cdot Y} \cdot \left[\frac{G \cdot T \cdot Z}{x}\right]^{.5}$$

$$CV = \frac{w}{63.3 \cdot Fp \cdot Y \cdot (x \cdot P1 \cdot \gamma 1)^{.5}}$$

Factors Fk, x, and y

Ratio of Specific Heats Factor

$$Fk = \frac{k}{1.40}$$

Pressure Drop Ratio

$$x = \frac{\Delta P}{P1}$$

Gas Expansion Factor

$$Y = 1 - \frac{x}{3 \cdot Fk \cdot xt}$$

Nomenclature

C_v	=	Valve flow capacity coefficient
Fp	=	Piping geometry factor, dimensionless
G	=	Specific gravity of gas relative to air at standard conditions (60°F, 14.7 psia)
ΔP	=	Pressure drop across linesize valve, or valve/reducer assembly, psi
P1	=	Pressure at the inlet of a linesize valve, or valve/reducer assembly, psia
q	=	Volumetric flow rate at standard conditions, ft^3/hr
T	=	Temperature at the inlet of a linesize valve, or valve/reducer assembly, °R
w	=	Weight flow rate, lb/hr
x	=	Ratio of pressure drop across linesize valve, or valve/reducer assembly to inlet pressure, dimensionless
xt	=	Terminal value of x for choked flow in linesize valves, dimensionless
Y	=	Gas expansion factor, dimensionless
Z	=	Gas compressibility factor, dimensionless
$\gamma 1$	=	Density at the inlet of a linesize valve, or valve/reducer assembly, lb/ft^3

Notes:

1) Use the same equations for calculating Fp as for liquid flow calculations.
2) The equations above are for informational purposes, anc cover simple, linesize, valve gas flow solutions. Where reducer effects or choked flow become involved, these calculations become considerably more complex, and beyond the intent of this document.

High Performance Three-Piece Ball Valve
Sharpe® Series V84

How to order Series V84

1"	V84	–	6	6	R	G	–	TE	–	E	–	X
Size	Series		Body & Ends	Ball & Stem	Seat	Seal		Ends		V Port		Option

Size
¼"
⅜"
½"
¾"
1"
1¼"
1½"
2"
3"
4"

Valve Series	
V84	Control

Body & Ends	
4	Carbon Steel
6	316 Stainless Steel

Ball & Stem	
6	316 Stainless Steel Ball and 17-4PH Stainless Steel Stem

Seat	
M	TFM™
N	Nova
R	RTFE
T	PTFE
D	Delrin®
P	Virgin PEEK
U	UHMWPE

Seal	
M	TFM™
G	Graphite
T	PTFE
V	Viton®
U	UHMWPE

Ends	
TE	Threaded Ends (NPT)
SW	Socketweld
BW10	Buttweld SCH 10*
BW40	Buttweld SCH 40
BW80	Buttweld SCH 80
1	150# Flanged RF*
3	300# Flanged RF*
6	600# Flanged RF*

Options	
X	Oxygen Clean as per MFG's Standards

V Port	
A	Round Port
C	V-Ball V15
D	V-Ball V30
E	V-Ball V60
F	V-Ball V90

Note:
*POA.
Viton® is a registered trademark of DuPont.
3M™, Dyneon™, TFM™ are trademarks owned by 3M.
Delrin® is a registered trademark of DuPont.

About ASC Engineered Solutions

ASC Engineered Solutions is defined by quality—in its products, services and support. With more than 1,400 employees, the company's portfolio of precision-engineered piping support, valves and connections provides products to more than 4,000 customers across industries, such as mechanical, industrial, fire protection, oil and gas, and commercial and residential construction. Its portfolio of leading brands includes ABZ Valve®, AFCON®, Anvil®, Anvil EPS, Anvil Services, Basic-PSA, Beck®, Catawissa, Cooplet®, FlexHead®, FPPI®, Gruvlok®, J.B. Smith, Merit®, North Alabama Pipe, Quadrant®, SCI®, Sharpe®, SlideLOK®, SPF® and SprinkFLEX®. With headquarters in Commerce, CA, and Exeter, NH, ASC also has ISO 9001:2015 certified production facilities in PA, TN, IL, TX, AL, LA, KS, and RI.

asc-es.com

Building connections that last™

ASC™ Engineered Solutions

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