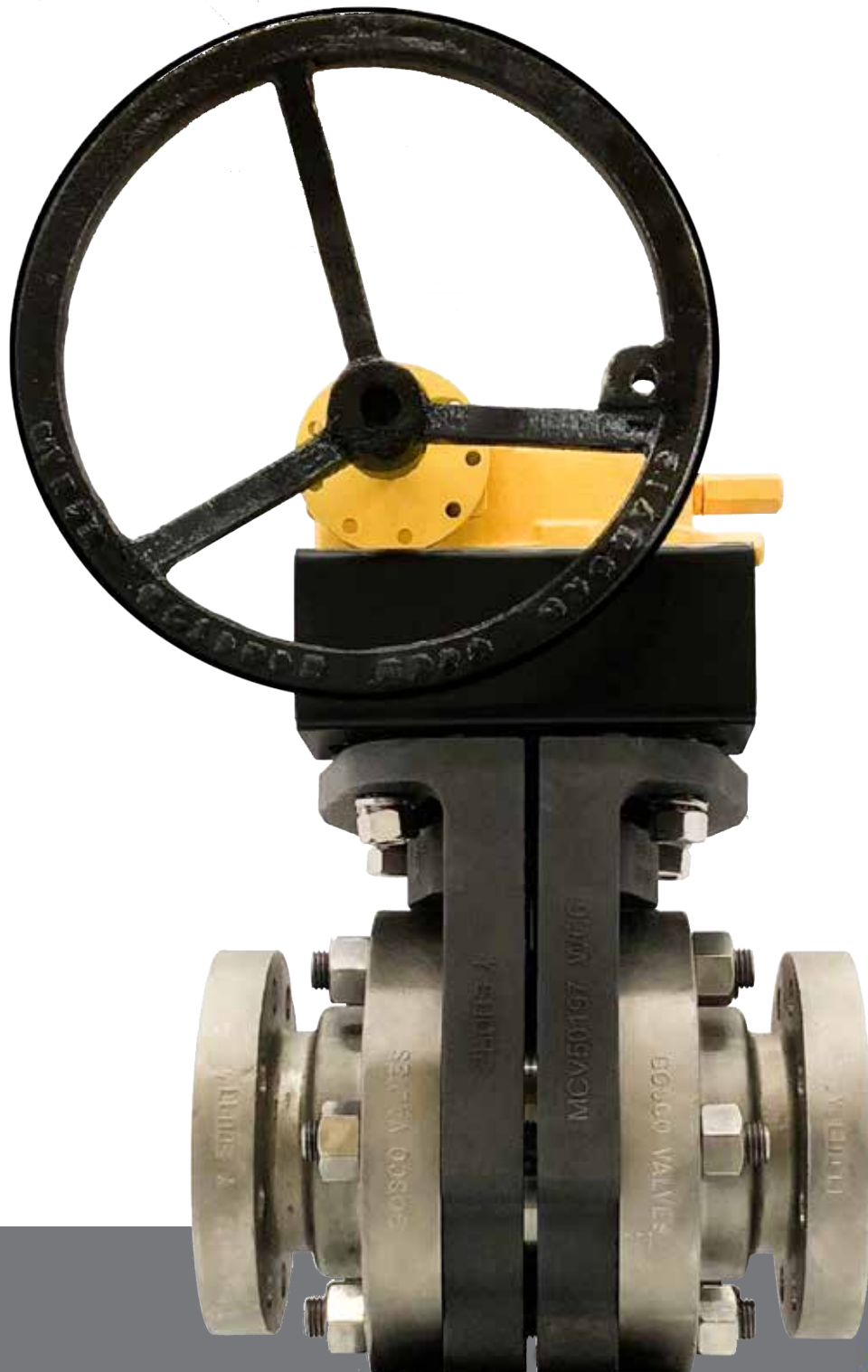
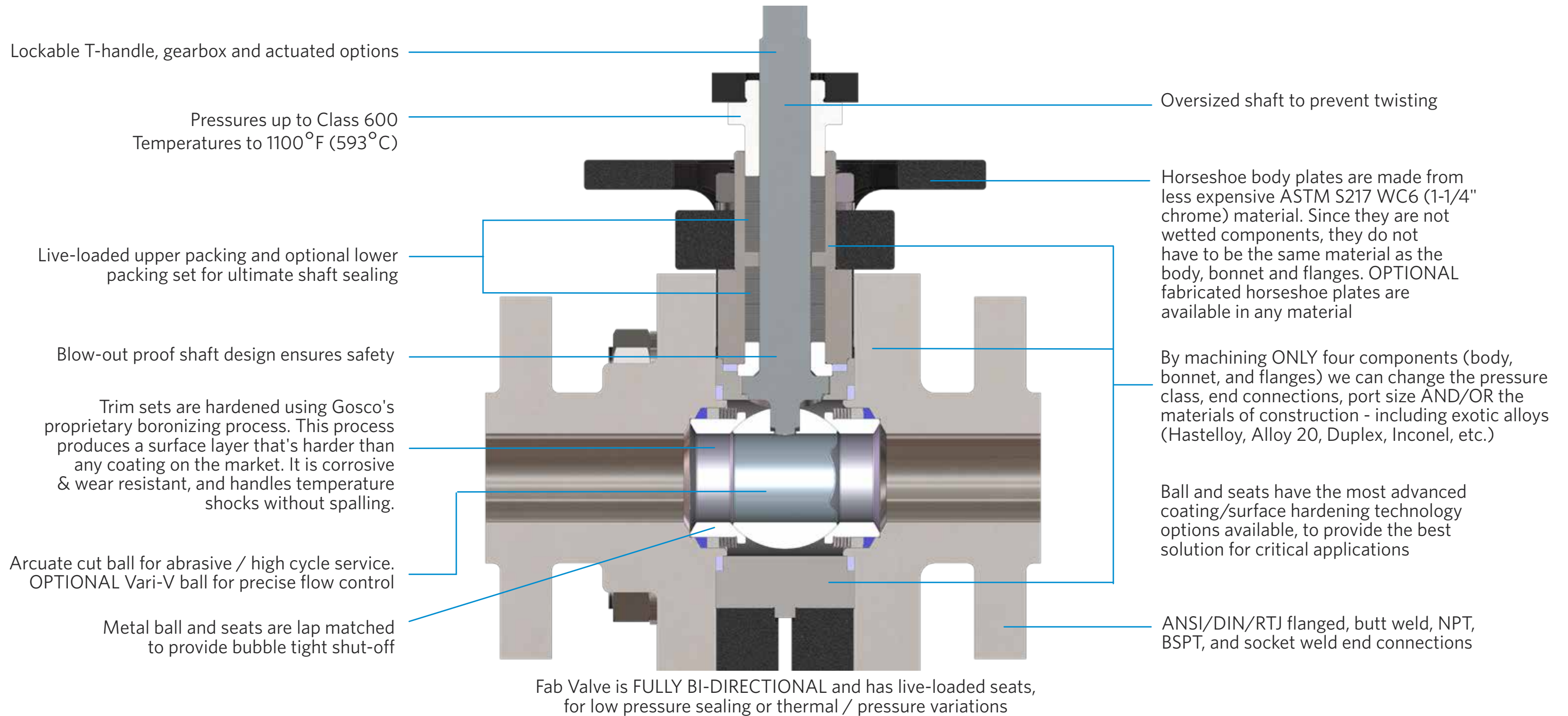


# FAB VALVE

FAST, FLEXIBLE, FLAWLESS SOFT/METAL SEATED VALVES



# FEATURES & BENEFITS



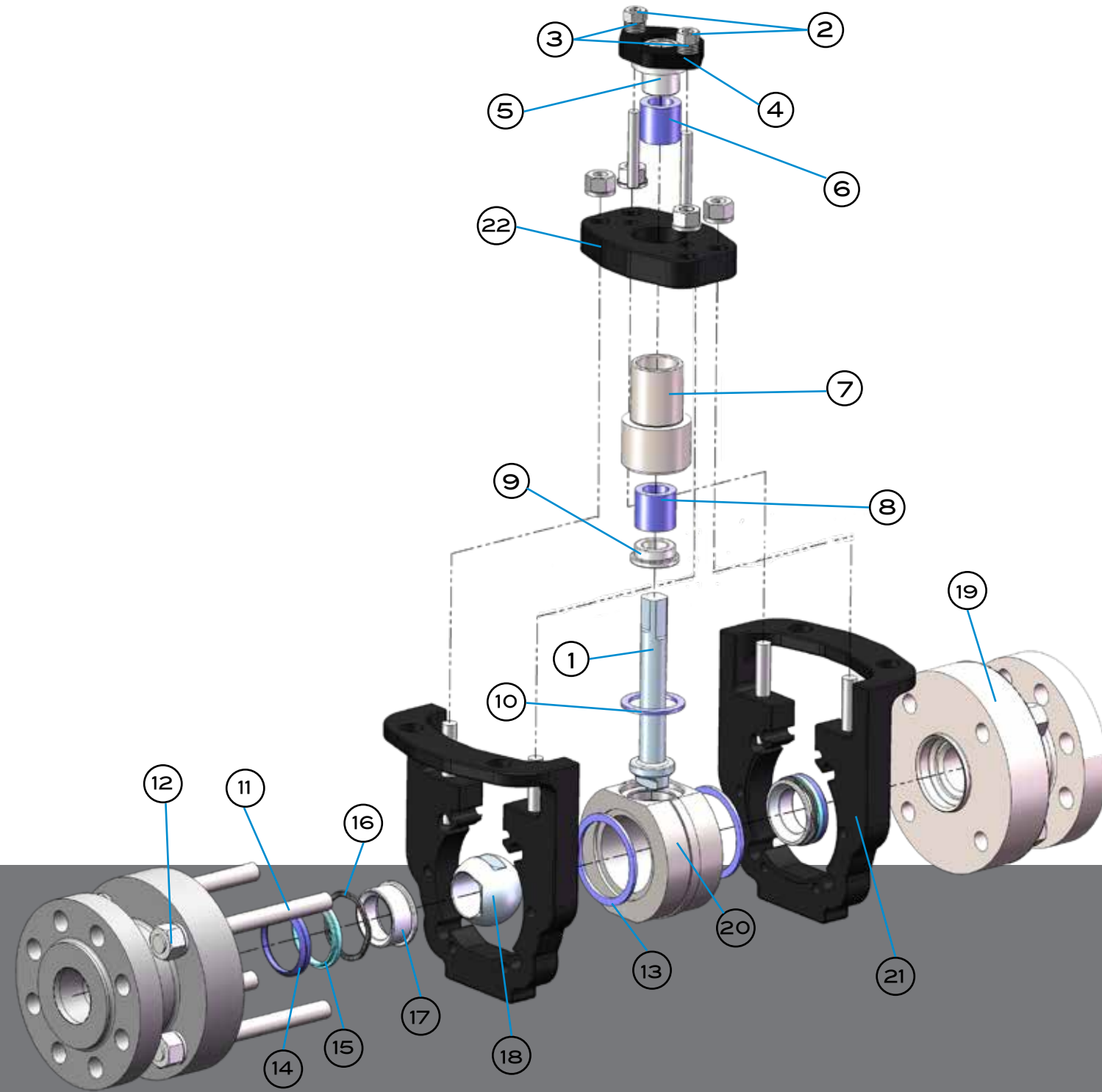
## A Cut Above

- NPS 1/2 full port to NPS 8 standard port (DN 15 to DN 200)
- Class 150 to 600
- -50°C (-58°F) TO 593°C (1100°F)

One year guarantee or extended guarantee options for special applications

- Bi-directional sealing to handle back pressures to the full pressure rating of the valve
- Body, bonnet, and flanges can be machined from bar stock for ultra-fast delivery

# EXPLODED VIEW



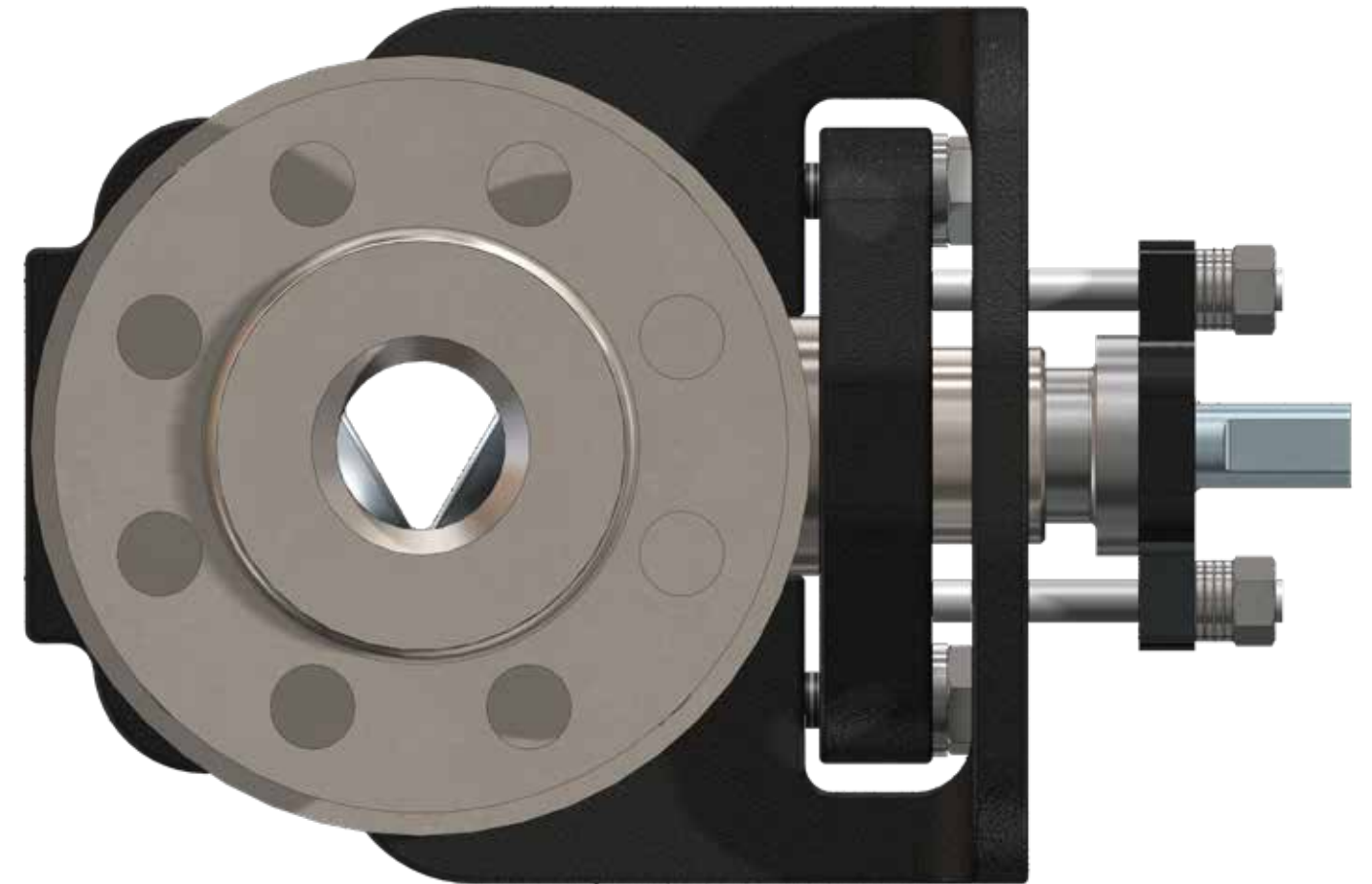
BlownAway

- 1) Shaft
- 2) Packing Adjustment Nuts
- 3) Belleville Washers
- 4) Gland Plate
- 5) Upper Shaft Guide
- 6) Upper Shaft Packing

- 7) Bonnet
- 8) Lower Shaft Packing
- 9) Lower Shaft Guide
- 10) Bonnet Gasket
- 11) End Cap Stud
- 12) End Cap Nut

- 13) Body Gasket
- 14) Wedge Seal
- 15) Compression Ring
- 16) Seat Spring
- 17) Seat
- 18) Ball

- 19) End Connection
- 20) Body
- 21) Horseshoe Body Plate
- 22) Bonnet Plate



## The Twins

With Gosco's cutting edge live-loaded seat technology, the **Fab Block & Bleed Valves** can be configured with soft or metal seats and meet both both API 6D, and OSHA block and bleed definitions.

With our proprietary boronizing procedure for trim hardening, encapsulated soft seats and any exotic alloy options, the Gosco block & bleed valves are extremely versatile and can tackle the toughest severe service applications.

## ControlFreak

The **Fab Vari-V Ball Valve** offers precise flow control through a specific profile that is machined into the ball.

When precise control of flow or pressure is required, the **Fab Vari-V Ball Valve** is perfect for your most difficult applications. Standard 10°, 30°, 60°, 90° V's are cut into the ball for a complete range of Cv's and control requirements. Custom profile V's are used for unusual applications requiring special flow characteristics.



# FAB VARI-V BALL OPTIONS

Linear-V



High Turndown-V



Filler-V



90° V-Ball



60° V-Ball



30° V-Ball



10° V-Ball



## SmartAlec

The profile of the V-ball determines the flow characteristic of the valve and can be changed to suit the application. 10°, 30°, 60° and 90° V-balls are the most commonly used, but several other profiles are available. The transition between high flow and fine control with the Vari-V is extremely smooth.

- **Linear-V** is a slot in the ball that can be machined for precise flow requirements.
- **High Turndown-V** is used when you need maximum flow for filling followed by precise flow to accurately control the levels.
- **Filler-V** maximizes flow in the open position, and provides fine flow control when the valve is partially closed.

## FreeSpirit

Custom V-balls are available for applications where specific flow requirements can not be met with the standard V-balls. Using Computational Fluid Dynamics (CFD), we can create a V-ball with a specific profile to fit any application. Anti-cavitation trim is also available.



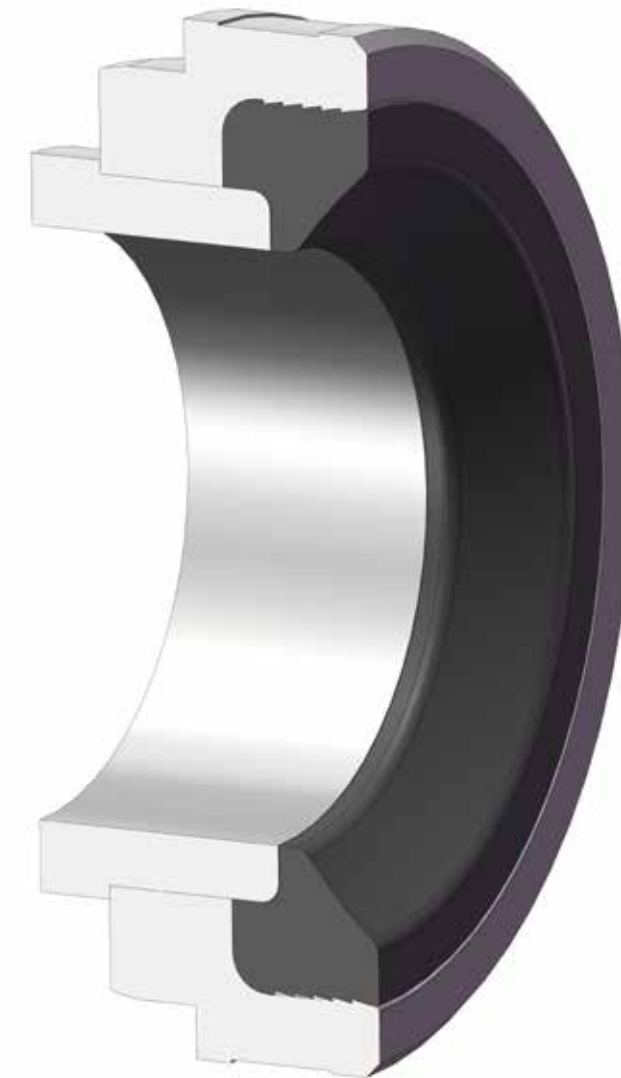
## ARCUATE CUT



### SlowPoke

An arcuate cut is a profile in the ball that reduces velocity both when the valve opens, and as it closes. When a standard ball valve is in the first and last 10° of opening, the gap between the ball and seat is an elliptical shape. The velocities are very high (especially in the corners), and erosion occurs. With an arcuate cut, the opening on the ball is close to three times larger. This reduces the velocity by spreading out the flow through a larger opening, which ultimately reduces wear on the ball and seats. An arcuate cut ball is best utilized in abrasive and high cycle applications.

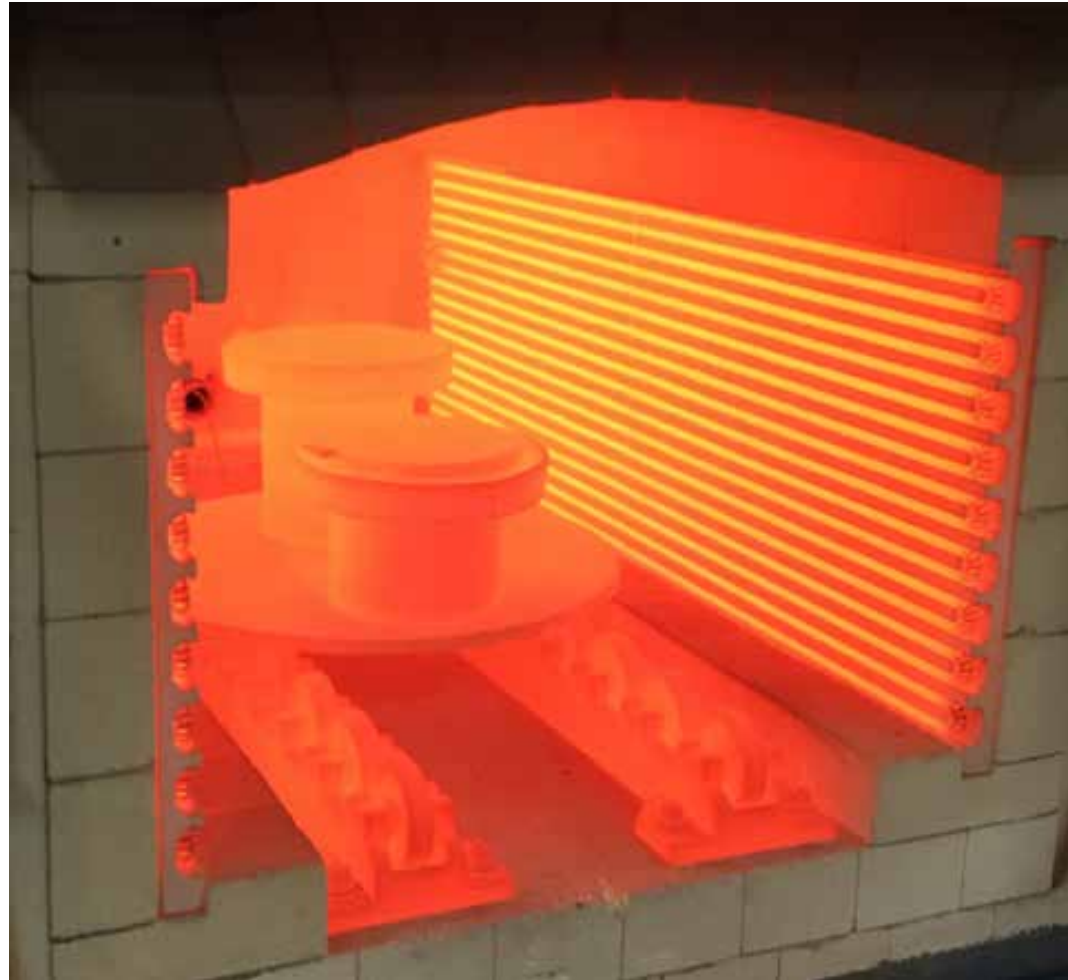
## ENCAPSULATED SEATS



### GuardianAngel

The Fab Valve Encapsulated Seat Assembly is designed to fully encapsulate the "Soft" insert on all sides to prevent cold flow and distortion. "Teeth" in the outer carrier hold the "Soft" insert in place to prevent the insert from moving. Any type of soft insert can be used, and the encapsulation allows us to increase the pressure AND temperature capabilities of the insert material. As well, the assembly is live loaded on both sides to make it fully bi-directional and able to seal at both low and high pressures. Using this design, we have been able to seal Teflon and Kel F at more than a 10,000 psi differential.

# BORONIZING

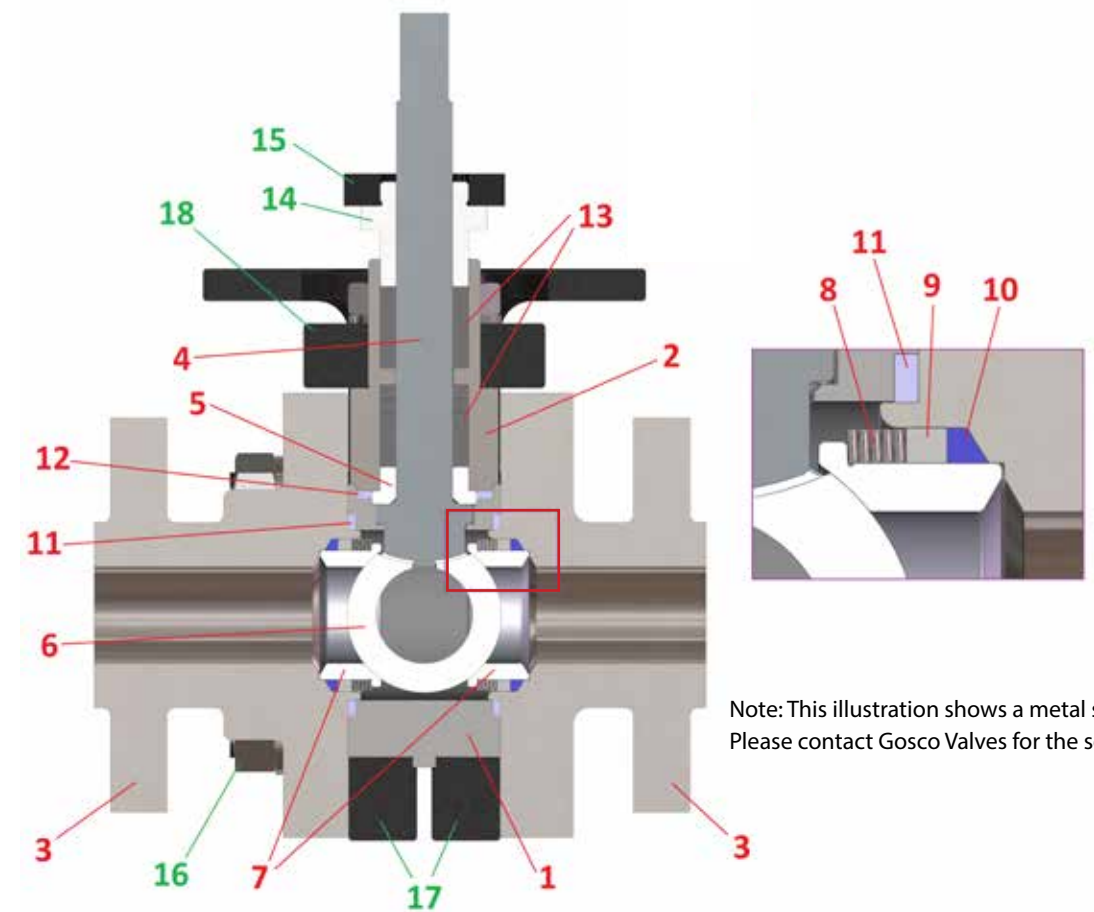


## HardAss

Boronizing is a thermo-chemical treatment in which boron atoms are diffused into the surface of a base metal to form an intermetallic layer. This layer is harder than any HVOF coating and the readings exceed the maximum hardness on the Rockwell C Scale

Gosco uses its own proprietary process that was developed in-house to be used specifically for severe service ball valve applications. The intermetallic layer and the base metal have the same expansion rates, so there is never an issue with "spalling" or "flaking". It can handle temperatures in excess of 700°C (1292°F), it is extremely corrosion resistant, and has superior wear/abrasion resistance to that of coatings.

# WETTED COMPONENTS

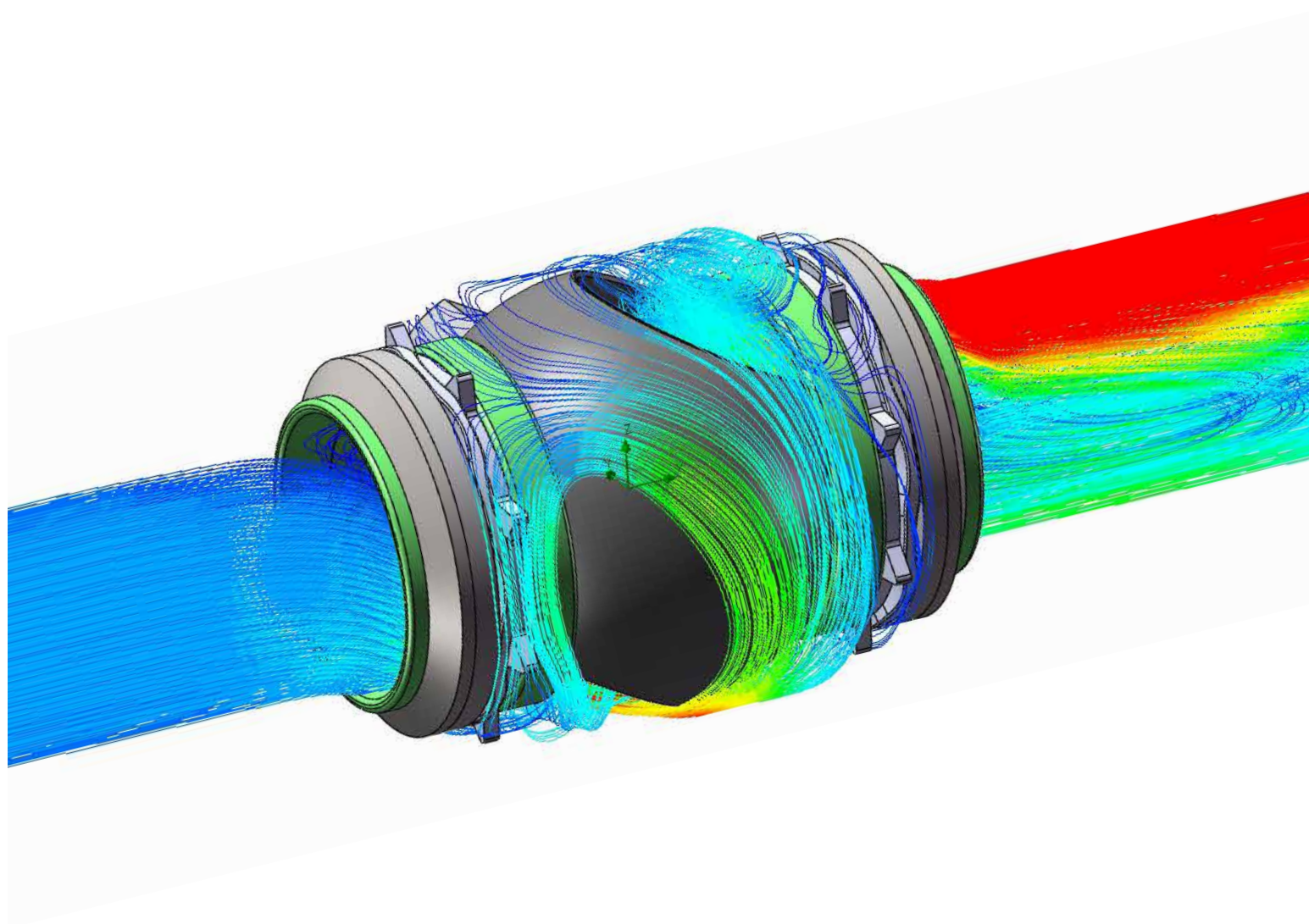


Note: This illustration shows a metal seated design. Please contact Gosco Valves for the soft seated version.

The chart below lists all wetted components (in red) with standard materials of construction. Please check each component to ensure it is chemically compatible with your process.

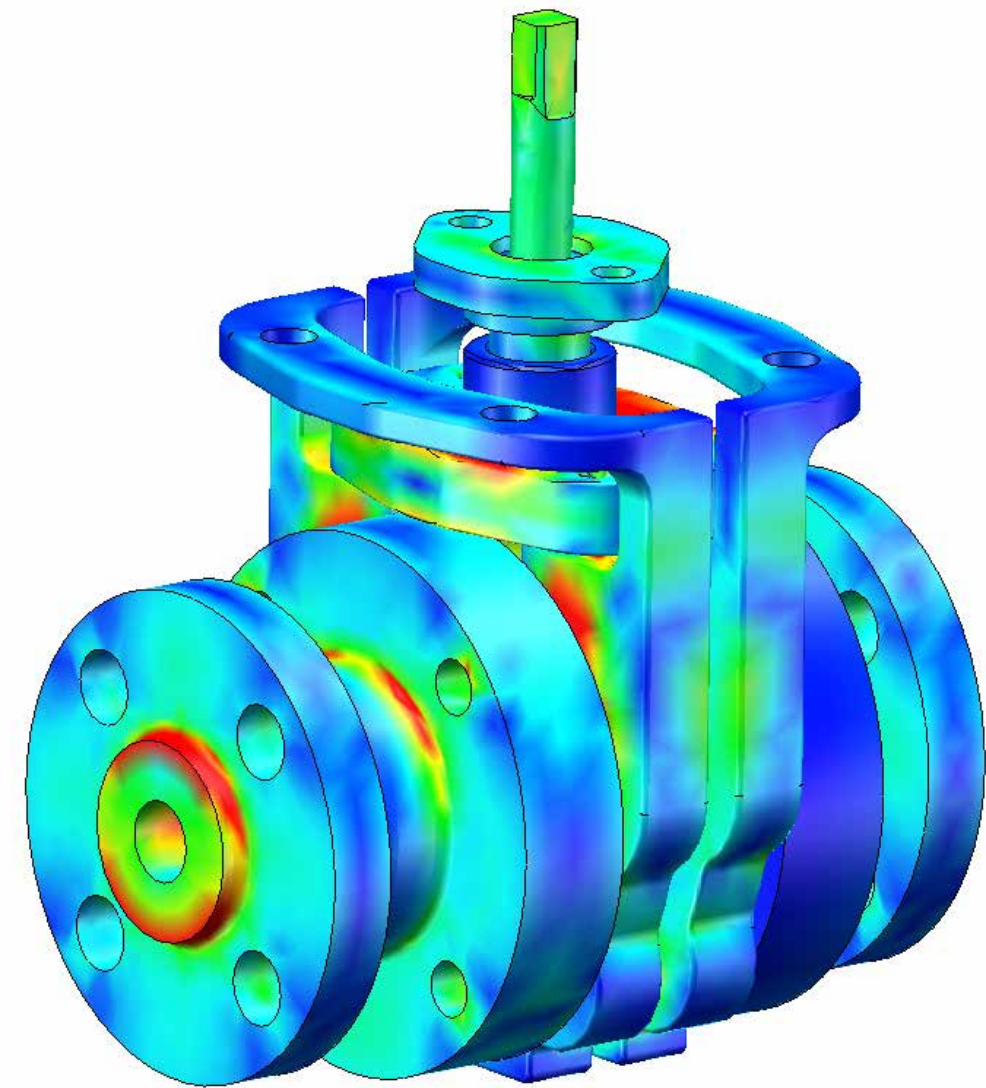
No.	Part Name	Wetted Component	Standard Material (Metal Seats)	Standard Material (Encapsulated Seats)	Standard Material (Soft Seats)
1	Body Core	Yes	Customer Spec	Customer Spec	Customer Spec
2	Bonnet	Yes	Customer Spec	Customer Spec	Customer Spec
3	Flange (x2)	Yes	Customer Spec	Customer Spec	Customer Spec
4	Shaft	Yes	A286	A286	A286
5	Thrust Washer	Yes	Nitronic 60	Nitronic 60	Nitronic 60
6	Ball	Yes	Inconel 718	Customer Spec	Customer Spec
7	Seat Carrier / Seat	Yes	None / Inconel 718	Customer Spec	Customer Spec
8	Seat Spring	Yes	Inconel 718	Inconel 718	N/A *
9	Compression Ring	Yes	316 SS	316 SS	N/A *
10	Wedge Seal	Yes	Graphite	Graphite	N/A *
11	Body Seal	Yes	Spiral wound 316 / Graphite	Spiral wound 316 / Graphite	Spiral wound 316 / Graphite
12	Bonnet Seal	Yes	Spiral wound 316 / Graphite	Spiral wound 316 / Graphite	Spiral wound 316 / Graphite
13	Shaft Packing	Yes	Graphoil or Teflon	Graphoil or Teflon	Graphoil or Teflon
14	Packing Follower	No	Nitronic 60	Nitronic 60	Nitronic 60
15	Gland Plate	No	CS	CS	CS
16	Bolting	No	Customer Spec	Customer Spec	Customer Spec
17	Body Plate (x2)	No	WC6	WC6	WC6
18	Bonnet Plate	No	WC6	WC6	WC6





### FluidPerformer

Computational Fluid Dynamics (CFD) is used to calculate the flow through the trim of a valve. It determines locations of high velocity and high flow, and assists in trim engineering for specific applications where velocities need to be controlled. CFD is also used to determine the flow coefficient ( $C_v$ ) of Gosco Vari-V balls and aids in designing them to custom specifications. The illustration shows flow through a trim set at 45° open.



### StressReliever

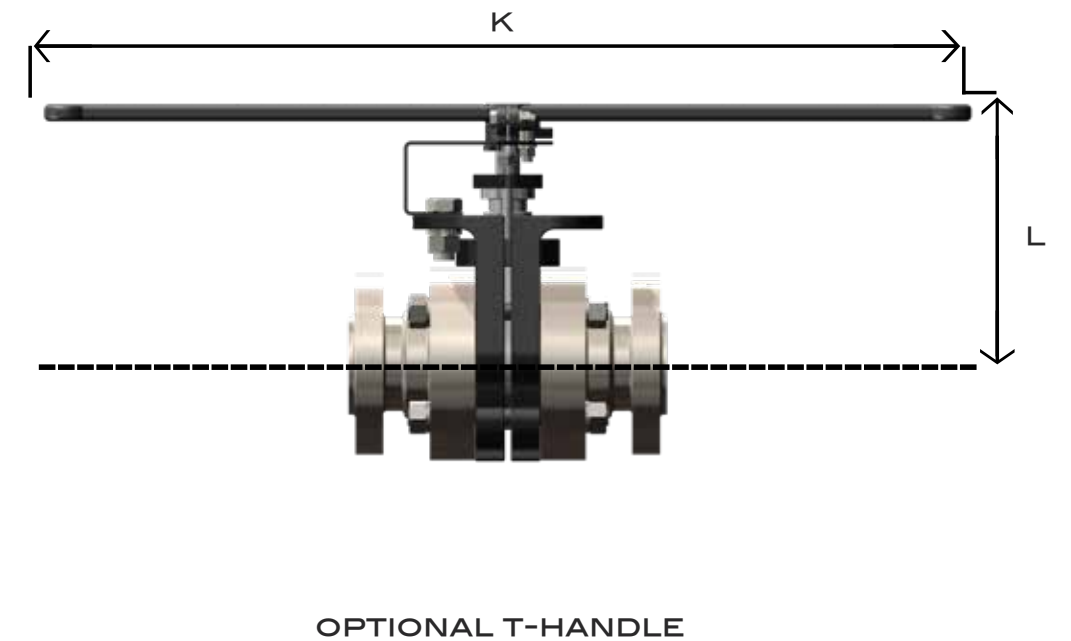
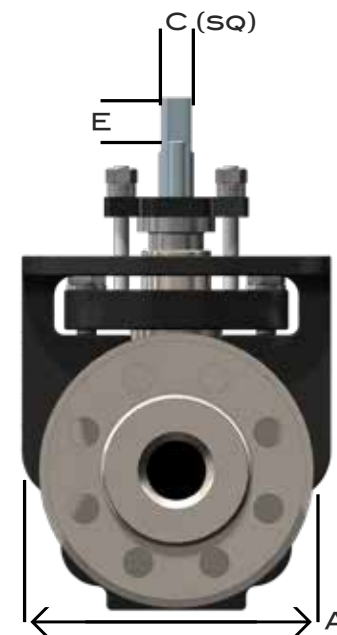
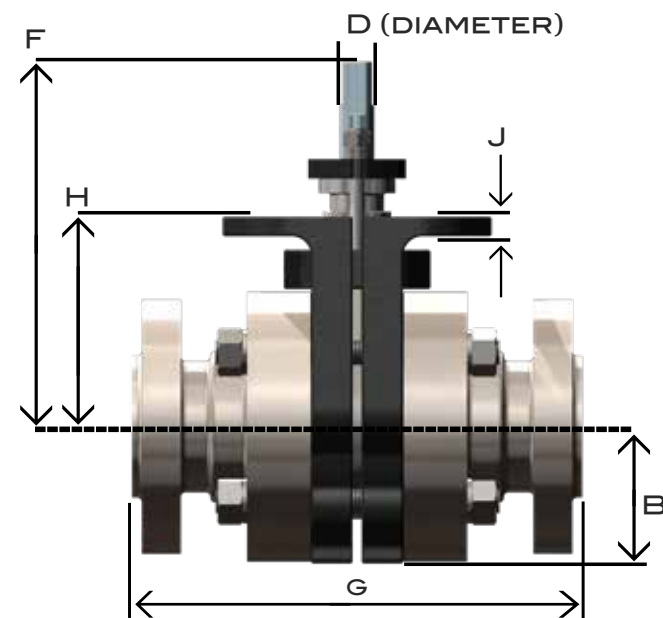
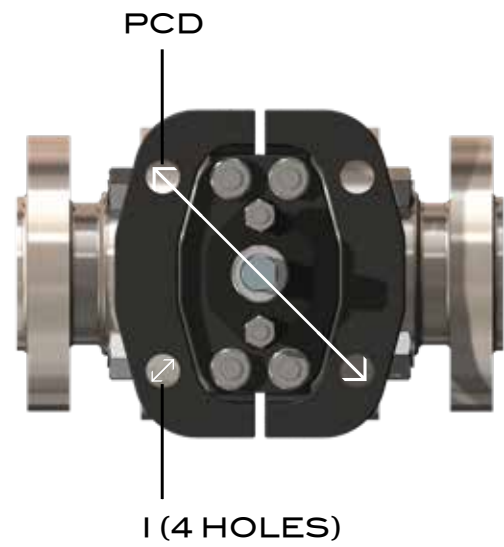
Finite Element Analysis (FEA) is used in Gosco Valves' design process to predict the behaviour of a valve's components by subjecting them to varying loads. This ensures structural integrity. The analysis is based on variables such as maximum pressure and temperature inside the valve, and maximum actuator torque. The illustration shows the stress distribution in the valve assembly, based on FEA analysis.



# DIMENSIONAL INFORMATION

Column values inches/millimetres.

Valve Size (NPS - DN)	A	B	C	D	E	F	G			H	Weight (lbs/kg)			I Hole Dia (x4)	PCD	ISO	J	K	L
							150	300	600		150	300	600						
1/2" FP (NPS 1/2 - DN 15)	5/127.0	2.25/57.2	0.373/0.95	0.5/1.3	0.531/13.5	4.97/126.2	4.25/10.8	5.5/14.0	6.5/16.5	3.43/87.0	19	20	23	0.41/10.3	4.016/102.0	FA10	0.38/9.5	12/304.8	6.4/162.6
3/4" SP (NPS 3/4 - DN 20)	5/127.0	2.25/57.2	0.373/0.95	0.5/1.3	0.531/13.5	4.97/126.2	4.62/11.7	6/15.2	7.5/19.1	3.43/87.0	21	23	26	0.41/10.3	4.016/102.0	FA10	0.38/9.5	12/304.8	6.4/162.6
3/4" FP (NPS 3/4 - DN 20)	6/152.4	2.75/69.9	0.498/1.26	0.625/1.6	0.719/18.3	6.53/165.9	4.62/11.7	6/15.2	7.5/19.1	4.25/108.0	29	35	38	0.56/14.3	4.921/125.0	FA12	0.38/9.5	18/457.2	8.2/208.3
1" SP (NPS 1 - DN 25)	6/152.4	2.75/69.9	0.498/1.26	0.625/1.6	0.719/18.3	6.53/165.9	5/12.7	6.5/16.5	8.5/21.6	4.25/108.0	31	34	45	0.56/14.3	4.921/125.0	FA12	0.38/9.5	18/457.2	8.2/208.3
1" FP (NPS 1 - DN 25)	6/152.4	2.75/69.9	0.498/1.26	0.625/1.6	0.719/18.3	6.53/165.9	5/12.7	6.5/16.5	8.5/21.6	4.25/108.0	31	34	45	0.56/14.3	4.921/125.0	FA12	0.38/9.5	18/457.2	8.2/208.3
1-1/2" SP (NPS 1-1/2 - DN 40)	6/152.4	2.75/69.9	0.498/1.26	0.625/1.6	0.719/18.3	6.53/165.9	6.5/16.5	7.5/19.1	9.5/24.1	4.25/108.0	35	42	53	0.56/14.3	4.921/125.0	FA12	0.38/9.5	18/457.2	8.2/208.3
1-1/2" FP (NPS 1-1/2 - DN 40)	7.75/196.9	3.5/88.9	0.748/1.90	0.875/2.2	1.063/27.0	7.54/191.5	6.5/16.5	7.5/19.1	9.5/24.1	5.38/136.5	60	67	80	0.81/20.7	6.496/165.0	FA16	0.50/12.7	24/609.6	10.0/254
2" SP (NPS 2 - DN 50)	7.75/196.9	3.5/88.9	0.748/1.90	0.875/2.2	1.063/27.0	7.54/191.5	7/17.8	8.5/21.6	11.5/29.2	5.38/136.5	65	76	97	0.81/20.7	6.496/165.0	FA16	0.50/12.7	24/609.6	10.0/254
2" FP (NPS 2 - DN 50)	8.5/215.9	3.89/98.8	0.748/1.90	1/2.5	1.125/28.6	8.43/214.1	7/17.8	8.5/21.6	11.5/29.2	6.13/155.6	92	98	123	0.81/20.7	7.5/190.5	N/A	0.63/15.9	30/762	10.6/269.2
3" SP (NPS 3 - DN 80)	8.5/215.9	3.89/98.8	0.748/1.90	1/2.5	1.125/28.6	8.43/214.1	8/20.3	11.12/28.2	14/35.6	6.13/155.6	108	126	150	0.81/20.7	7.5/190.5	N/A	0.63/15.9	30/762	10.6/269.2
3" FP (NPS 3 - DN 80)	10.88/276.2	5.07/128.8	1.248/3.17	1.5/3.8	1.813/46.1	11.43/290.3	8/20.3	11.12/28.2	14/35.6	7.88/200.0	167	198	241	0.94/23.8	8.75/222.3	N/A	0.75/19.1	GEARBOX REQUIRED	
4" SP (NPS 4 - DN 100)	10.88/276.2	5.07/128.8	1.248/3.17	1.5/3.8	1.813/46.1	11.43/290.3	9/22.9	12/30.5	17/43.2	7.88/200.0	188	221	291	0.94/23.8	8.75/222.3	N/A	0.75/19.1		
4" FP (NPS 4 - DN 100)	13.25/336.6	6.25/158.8	1.248/3.17	1.75/4.4	1.875/47.6	13.23/336.0	9/22.9	12/30.5	17/43.2	9.13/231.8	289	329	450	1.09/27.8	10/254.0	N/A	0.88/22.2		
6" SP (NPS 6 - DN 150)	13.25/336.6	6.25/158.8	1.248/3.17	1.75/4.4	1.875/47.6	13.23/336.0	15.5/39.4	15.88/40.3	22/55.9	9.13/231.8	428	459	571	1.09/27.8	10/254.0	N/A	0.88/22.2		
6" FP (NPS 6 - DN 150)	16.75/425.5	8/203.2	1.498/3.80	2/5.1	2.125/54.0	15.3/388.6	15.5/39.4	15.88/40.3	22/55.9	11.50/292.1	611	648	901	1.22/31.0	12/304.8	N/A	1.00/25.4		
8" SP (NPS 8 - DN 200)	16.75/425.5	8/203.2	1.498/3.80	2/5.1	2.125/54.0	15.3/388.6	18/45.7	19.75/50.2	26/66.0	11.50/292.1	679	746	1030	1.22/31.0	12/304.8	N/A	1.00/25.4		



# PRESSURE / TEMPERATURE CHARTS

# C<sub>v</sub> VALUES

316 Stainless Steel (316/F316/CF8M/316H/F316H/CF10M)			
Temp °F / °C	Pressure (psi / Bar)		
	150	300	600
-20° to 100° / -29° to 38°	275 / 19.0	720 / 49.6	1440 / 99.3
200° / 93°	235 / 16.2	620 / 42.7	1240 / 85.5
300° / 149°	215 / 14.8	560 / 38.6	1120 / 77.2
400° / 204°	195 / 13.4	515 / 35.5	1025 / 70.7
500° / 260°	170 / 11.7	480 / 33.1	955 / 65.8
600° / 316°	140 / 9.7	450 / 31.0	900 / 62.1
650° / 343°	125 / 8.6	440 / 30.3	885 / 61.0
700° / 371°	110 / 7.6	435 / 30.0	870 / 60.0
750° / 399°	95 / 6.6	425 / 29.3	855 / 59.0
800° / 427°	80 / 5.5	420 / 29.0	845 / 58.3
850° / 454°	65 / 4.5	420 / 29.0	835 / 57.6
900° / 482°	50 / 3.4	415 / 28.6	830 / 57.2
950° / 510°	35 / 2.4	385 / 26.5	775 / 53.4
1000° / 538°	20 / 1.4	365 / 25.2	725 / 50.0

Inconel 625 (N06625) & Hastelloy C276 (N10276)			
Temp °F / °C	Pressure (psi / Bar)		
	150	300	600
-20° to 100° / -29° to 38°	290 / 20.0	750 / 51.7	1500 / 103.4
200° / 93°	260 / 17.9	750 / 51.7	1500 / 103.4
300° / 149°	230 / 15.9	730 / 50.3	1455 / 100.3
400° / 204°	200 / 13.8	700 / 48.3	1395 / 96.2
500° / 260°	170 / 11.7	665 / 45.9	1330 / 91.7
600° / 316°	140 / 9.7	605 / 41.7	1210 / 83.4
650° / 343°	125 / 8.6	590 / 40.7	1175 / 81.0
700° / 371°	110 / 7.6	570 / 39.3	1135 / 78.3
750° / 399°	95 / 6.6	530 / 36.5	1065 / 73.4
800° / 427°	80 / 5.5	510 / 35.2	1015 / 70.0
850° / 454°	65 / 4.5	485 / 33.4	975 / 67.2
900° / 482°	50 / 3.4	450 / 31.0	900 / 62.1
950° / 510°	35 / 2.4	385 / 26.5	775 / 53.4
1000° / 538°	20 / 1.4	365 / 25.2	725 / 50.0

Alloy 20 (N08020)			
Temp °F / °C	Pressure (psi / Bar)		
	150	300	600
-20° to 100° / -29° to 38°	290 / 20.0	750 / 51.7	1500 / 103.4
200° / 93°	260 / 17.9	740 / 51.0	1485 / 102.4
300° / 149°	230 / 15.9	710 / 49.0	1420 / 97.9
400° / 204°	200 / 13.8	680 / 46.9	1365 / 94.1
500° / 260°	170 / 11.7	655 / 45.2	1310 / 90.3
600° / 316°	140 / 9.7	605 / 41.7	1210 / 83.4
650° / 343°	125 / 8.6	590 / 40.7	1175 / 81.0
700° / 371°	110 / 7.6	570 / 39.3	1135 / 78.3
750° / 399°	95 / 6.6	530 / 36.5	1065 / 73.4
800° / 427°	80 / 5.5	510 / 35.2	1015 / 70.0

1-1/4 Chrome Alloy Steel (F11 Class 2, WC6)			
Temp °F / °C	Pressure (psi / Bar)		
	150	300	600
-20° to 100° / -29° to 38°	290 / 20.0	750 / 51.7	1500 / 103.4
200° / 93°	260 / 17.9	750 / 51.7	1500 / 103.4
300° / 149°	230 / 15.9	720 / 49.6	1445 / 99.6
400° / 204°	200 / 13.8	695 / 47.9	1385 / 95.5
500° / 260°	170 / 11.7	665 / 45.9	1330 / 91.7
600° / 316°	140 / 9.7	605 / 41.7	1210 / 83.4
650° / 343°	125 / 8.6	590 / 40.7	1175 / 81.0
700° / 371°	110 / 7.6	570 / 39.3	1135 / 78.3
750° / 399°	95 / 6.6	530 / 36.5	1065 / 73.4
800° / 427°	80 / 5.5	510 / 35.2	1015 / 70.0
850° / 454°	65 / 4.5	485 / 33.4	975 / 67.2
900° / 482°	50 / 3.4	450 / 31.0	900 / 62.1
950° / 510°	35 / 2.4	320 / 22.1	640 / 44.1
1000° / 538°	20 / 1.4	215 / 14.8	430 / 29.6

Carbon Steel (A105, LF2, WCB)			
Temp °F / °C	Pressure (psi / Bar)		
	150	300	600
-20° to 100° / -29° to 38°	285 / 19.7	740 / 51.0	1480 / 102.0
200° / 93°	260 / 17.9	680 / 46.9	1360 / 93.8
300° / 149°	230 / 15.9	655 / 45.2	1310 / 90.3
400° / 204°	200 / 13.8	635 / 43.8	1265 / 87.2
500° / 260°	170 / 11.7	605 / 41.7	1205 / 83.1
600° / 316°	140 / 9.7	570 / 39.3	1135 / 78.3
650° / 343°	125 / 8.6	550 / 37.9	1100 / 75.8
700° / 371°	110 / 7.6	530 / 36.5	1060 / 73.1
750° / 399°	95 / 6.6	505 / 34.8	1015 / 70.0
800° / 427°	80 / 5.5	410 / 28.3	825 / 56.9

Duplex (S32205, S31803) Super Duplex (S32750, S32760)			
Temp °F / °C	Pressure (psi / Bar)		
	150	300	600
-20° to 100° / -29° to 38°	290 / 20.0	750 / 51.7	1500 / 103.4
200° / 93°	260 / 17.9	745 / 51.4	1490 / 102.7
300° / 149°	230 / 15.9	665 / 45.9	1335 / 92.0
400° / 204°	200 / 13.8	615 / 42.4	1230 / 84.8
500° / 260°	170 / 11.7	580 / 40.0	1160 / 80.0
600° / 316°	140 / 9.7	555 / 38.3	1115 / 76.9

C<sub>v</sub> is defined as the flow of water at 60°F in US gallons per minute through a valve with a 1 psi pressure drop.

Valve Size	Vari-V	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	Non Vari-V Ball C <sub>v</sub> 's
1/2" FP	10°	2.95	2.36	1.94	1.53	1.19	0.84	0.51	0.13	0.00	0.00	23
	30°	5.76	3.99	3.15	2.22	1.46	0.89	0.51	0.14	0.02	0.00	
	60°	10.13	6.93	4.56	3.18	2.02	1.32	0.73	0.15	0.03	0.00	
	90°	15.28	9.83	6.29	4.10	2.57	1.58	0.84	0.16	0.03	0.00	
3/4" SP	10°	3.01	2.22	1.84	1.31	1.01	0.71	0.49	0.12	0.00	0.00	15
	30°	4.96	3.62	2.89	2.13	1.45	0.83	0.53	0.13	0.04	0.00	
	60°	8.16	5.84	4.54	3.00	1.82	1.18	0.67	0.14	0.04	0.00	
	90°	11.18	7.73	5.57	3.87	2.39	1.36	0.83	0.15	0.04	0.00	
3/4" FP	10°	4.27	3.55	2.70	2.13	1.55	1.19	0.66	0.37	0.03	0.00	45
	30°	8.43	6.45	4.88	3.51	2.18	1.49	0.79	0.38	0.03	0.00	
	60°	16.84	11.09	7.59	5.12	3.17	2.09	0.95	0.41	0.03	0.00	
	90°	27.63	17.52	11.28	6.70	4.14	2.47	1.29	0.46	0.03	0.00	
1" SP	10°	4.03	3.29	2.48	2.02	1.50	0.98	0.58	0.34	0.01	0.00	30
	30°	7.63	5.93	4.59	3.30	2.38	1.33	0.72	0.35	0.01	0.00	
	60°	15.82	10.80	7.47	4.74	3.18	1.96	0.95	0.36	0.01	0.00	
	90°	19.37	13.37	9.17	6.28	4.07	2.47	1.44	0.60	0.02	0.00	
1" FP	10°	5.88	4.97	4.25	3.28	2.14	1.74	1.06	0.84	0.22	0.00	77
	30°	12.34	9.86	7.50	5.36	3.89	2.41	1.63	0.95	0.24	0.00	
	60°	26.91	17.37	12.47	8.19	5.45	3.45	2.16	0.97	0.26	0.00	
	90°	40.62	26.78	17.96	11.74	7.48	4.49	2.55	1.09	0.28	0.00	
1 1/2" SP	10°	5.166	4.581	3.69	2.817	2.088	1.431	0.981	0.594	0.189	0.00	82
	30°	9.675	8.46	5.967	4.536	3.195	2.07	1.386	0.612	0.207	0.00	
	60°	20.97	14.031	9.927	7.299	4.536	2.88	1.764	0.855	0.216	0.00	
	90°	33.48	23.481	15.534	9.396	6.219	3.933	2.142	0.936	0.234	0.00	
1 1/2" FP	10°	12.76	11.06	7.65	5.94	5.21	3.50	2.41	0.89	0.00	0.00	192
	30°	28.60	22.35	15.23	11.38	8.30	5.48	2.46	1.37	0.46	0.00	
	60°	55.73	40.16	26.54	17.53	11.87	7.31	3.07	1.59	0.34	0.00	
	90°	96.99	62.87	38.90	24.95	15.69	9.73	5.46	2.37	0.62	0.00	
2" SP	10°	13.41	10.22	8.12	5.98	4.74	3.88	2.43	1.28	0.00	0.00	120
	30°	27.15	20.92	15.36	11.54	7.25	4.90	3.43	1.37	0.41	0.00	
	60°	49.56	35.81	24.77	17.20	10.88	7.21	4.10	1.71	0.37	0.00	
	90°	80.14	52.63	35.60	23.75	14.43	9.03	5.42	2.07	0.00	0.00	
2" FP	10°	21.53	16.98	16.01	12.47	10.07	5.26	4.43	2.37	0.79	0.00	358
	30°	47.47	37.46	37.32	20.75	14.12	9.65	6.53	3.05	1.15	0.00	
	60°	92.06	69.69	49.08	31.92	21.36	13.98	8.52	4.21	1.31	0.00	
	90°	173.40	110.49	73.44	48.50	29.56	18.56	11.54	5.13	1.44	0.00	
3" SP	10°	16.767	13.338	11.052	8.082	6.3	4.509	2.781	1.773	0.441	0.00	350
	30°	37.566	30.222	23.544	16.668	12.24	7.731	4.239	2.304	0.477	0.00	
	60°	74.898	54.036	39.915	26.982	18.369	11.304	6.597	3.339	0.585	0.00	
	90°	125.46	80.856	55.467	37.188	24.813	15.912	8.784	4.743	0.891	0.00	
3" FP	10°	47.02	32.65	26.34	19.84	15.89	12.27	7.97	3.98	1.81	0.00	858
	30°	105.15	80.57	58.10	42.90	29.96	19.58	12.14	5.04	1.96	0.00	
	60°	190.26	136.08	112.14	82.22	54.10	27.6	15.80	13.54	11.06	0.00	
	90°	388.90	235.03	157.48	99.49	64.78	38.4	22.2	11.64	3.53	0.00	
4" SP	10°	44.07	33.64	27.16	21.85	16.37	11.61	8.46	4.82	1.66	0.00	607
	30°	95.43	77.54	57.24	42.34	28.95	19.77	13.05	6.04	2.06	0.00	
	60°	171.46	139.82	103.63	68.86	47.12	27.80	16.79	7.85	2.07	0.00	
	90°	283.27	208.78	147.71	98.21	62.96	41.66	25.34	10.82	3.15	0.00	
4" FP	10°	58.97	52.74	43.58	33.52	25.93	18.16	11.12	7.42	3.66	1.65	1512
	30°	160.29	131.67	100.78	72.91	53.71	35.10	19.49	10.73	3.90	1.34	
	60°	332.17	243.98	174.60	118.86	81.15	51.80	24.79	15.34	6.48	1.01	
	90°	652.17	401.89	262.88	170.63	111.42	73.39	43.49	24.32	7.20	1.38	
6" SP	10°	71.0	58.0	45.0	35.0	26.0	20.0	13.0	7.0	3.1	0.00	1055
	30°	164.0	129.0	95.0	70.0	51.0	36.0	22.0	11.0	4.1	0.00	
	60°	270.0	213.0	163.0	115.0	76.0	51.0	31.0	15.0	4.8	0.00	
	90°	409.0	329.0	244.0	166.0	110.0	72.0	44.0	22.0	7.4	0.00	
6" FP	10°	148.0	112.0	91.0	76.0	55.0	40.0	30.0	19.0	7.4	0.00	3664
	30°	367.0	286.0	205.0	146.0	104.0	70.0	47.0	25.0	9.0	0.00	
	60°	816.0	568.0	414.0	272.0	177.0	110.0	67.0	34.0	10.0	0.00	
	90°	1292.0	890.0	581.0	382.0	234.0	145.0	88.0	45.0	14.		

# FAB VALVE PART NUMBERING SYSTEM

(e.g. P/N: 03FF600-SS1717BRAR-GB1BND is NPS 1, full port, Class 600 flanged valve with 316SS body/bonnet/flanges, Inconel 718 shaft, borided Inconel 718 ball/seats, arcuate cut, graphoil packing, bare shaft, NACE 0175 (All), block and bleed (DIB), configuration and fire safe design)

SIZE / PRESSURE CLASS				MATERIALS OF CONSTRUCTION / BALL & SEATS					OPTIONS / TYPES / FEATURES					
SIZE	PORT	CONNECTIONS	RATING	SHELL COMPONENTS	SHAFT	BALL MATERIAL	BALL/SEAT TYPE	BALL PROFILE	GLAND PACKAGING	DRIVE	NACE/O <sub>2</sub>	BLOCK & BLEED/ HIGH CYCLE	SPECIAL FEATURES	OPTIONS
01 = DN 15 / NPS ½	F = Full	F = RF Flanged	150 = CL 150	SS = 316 SS	A8 = A286 SS	I7 = Inconel 718	BR = Borided Ball & Seats	10 = 10' Vari V'	T = Teflon Single Packing	A = Actuated	1 = NACE 0175 (All)	B = Block & Bleed (DIB) <sup>7</sup>	C = HVOF Coating (Bore) <sup>9</sup>	F = Fire Safe Certified
02 = DN 20 / NPS ¾	R = Reduced	R = RTJ Flanged	300 = CL 300	SH = 316H SS	I7 = Inconel 718	SS = 316 SS	BB = Borided Ball	30 = 30' Vari V	C = Teflon Dual Packing	B = Bare Shaft	2 = NACE 0175 (Wetted)	1 = Block & Bleed (DIB 1) <sup>7</sup>	F = Flush Port <sup>10</sup>	D = Fire Safe Design
03 = DN 25 / NPS 1	D = 2x Reduced	D = DIN Flanged	400 = CL 400	SL = 316L SS	S7 = 17-4PH SS	S3 = 304 SS	BC = Borided Ball/Cavity Filler Seats	60 = 60' Vari V	S = Graphite Single Packing	T = Tee Handle	3 = NACE 0103 (All)	2 = Block & Bleed (DIB 2) <sup>7</sup>	M = Monitoring Port <sup>11</sup>	A = Anti Static
05 = DN 40 / NPS 1.5	O = Other	N = NPT (F)	600 = CL 600	S3 = 304 SS	SS = 316 SS	S4 = 410 SS	SC = Borided Ball/Borided Scraper Seats	90 = 90' Vari V	G = Graphite Dual Packing	G = Gear Box	4 = NACE 0103 (Wetted)	H = High Cycle Option <sup>8</sup>	D = Drilled Ball (Upstream)	B = Custom Bolting
06 = DN 50 / NPS 2		M = BSPT	PN2 = PN 20	DP = Duplex SS <sup>1</sup>	S3 = 304 SS	S7 = 17-4PH SS	CV = Cavity Filler Seats	LN = Linear V	M = Graphite/Teflon Packing	O = Other	5 = Oxygen Cleaning	N = Not Applicable	1 = Option (C + F)	H = Fabricated Horseshoe <sup>12</sup>
08 = DN 80 / NPS 3		T = SAE	PN5 = PN 50	SD = Super Duplex SS <sup>1</sup>	A2 = Alloy 20	A2 = Alloy 20	EN = Encapsulated Seats (316 SS Carrier)	FL = Filler V	F = ISO 15848 FE Test		N = Not Applicable	O = Other	2 = Option (C + M)	1 = Option (F + A)
09 = DN 100 / NPS 4		B = Butt Weld	PNX = PN 100	A2 = Alloy 20 <sup>1</sup>	DP = Duplex SS	DP = Duplex SS	EX = Encapsulated Seats (XX Carrier) <sup>6</sup>	HT = High Turndown V	O = Other		O = Other		3 = Option (M + D)	2 = Option (D + A)
10 = DN 150 / NPS 6		S = Socketweld	WOG = 1500 WOG	HB = Hastelloy B <sup>1</sup>	SD = Super Duplex SS	SD = Super Duplex SS	CC = Chrome Carbide HVOF Ball & Seats	AR = Arcuate Cut					N = Not Applicable	3 = Option (D + B)
11 = DN 200 / NPS 8		G = Grayloc Hubs	OTH = Other	HC = Hastelloy C276 <sup>1</sup>	HB = Hastelloy B	HB = Hastelloy B	CB = Chrome Carbide HVOF Ball	OT = Other					O = Other	4 = Option (B + H)
OT = Other		O = Other		I6 = Inconel 625 <sup>1</sup>	HC = Hastelloy C276	HC = Hastelloy C276	TC = Tungsten Carbide HVOF Ball & Seats	NO = None						N = Not Applicable
				MO = Monel (X) <sup>1,2</sup>	I6 = Inconel 625	I6 = Inconel 625	TB = Tungsten Carbide HVOF Ball							O = Other
				TI = Titanium (X) <sup>1,2</sup>	MO = Monel (X) <sup>2</sup>	MO = Monel (X) <sup>2</sup>	KB = Kolsterised Ball							
				CS = A105 CS	TI = Titanium (X) <sup>2</sup>	TI = Titanium (X) <sup>2</sup>	NA = Not Applicable							
				LF = LF2 CS	OT = Other <sup>6</sup>	CR = Ceramic (X) <sup>2</sup>	OT = Other							
				F1 = F11 (1¼ Chrome)		OT = Other								
				F2 = F22 (2¼ Chrome)										
				F9 = F91 (9 Chrome)										
				CX = Combination (X) = <sup>3</sup>										
				OT = Other										

<sup>1</sup> Confirm compatibility of other wetted parts in the valve (Contact Gosco for "Wetted Components List" to clarify compatibility of other components in the valve)

<sup>2</sup> For specific grades of Monel, Titanium or ceramic (Zirconium) not listed in the Part Numbering System, contact Gosco Valves to get a two digit code. Note: Monel 400 and Titanium 2 are standard

<sup>3</sup> For different combinations of Body/Bonnet and Flanges, contact Gosco Valves to get a two digit code

<sup>4</sup> If the seat materials are not shown here, use the two digit code under "BALL" materials

<sup>5</sup> If this letter is a "B" or "H", contact Gosco Valves because it is the old part numbering system

<sup>6</sup> For corrosive applications, the carrier material should match the ball material

<sup>7</sup> Contact Gosco for Block & Bleed definitions

<sup>8</sup> High cycle option could include PEEK shaft bearings, enlarged shaft slot, high strength shaft, locating nub in the ball, anti-backlash coupling etc

<sup>9</sup> Specify type of HVOF coating (Chrome Carbide/Tungsten Carbide etc), and area to be coated (Upstream flange, downstream flange and/or body)

<sup>10</sup> Specify location(s), size and connection type of the flush port(s). Note: 1/4" NPT is standard

<sup>11</sup> Specify location(s), size and connection type of the monitoring port(s). Note: 1/4" NPT is standard

<sup>12</sup> Standard Fabricated Horseshoe plate material is ASTM A217, Gr. WC6. Contact Gosco if plate material needs to be changed.

## WARRANTY

WARRANTY - The Seller warrants its products against defects in material or workmanship, when used on those services approved by the Seller, for a period of one (1) year from date of original shipment. The Seller's liability under this warranty shall be limited to repair or replacement at Seller's option of such defective products, F.O.B. factory, upon proof of defect satisfactory to Seller. Seller shall have no further liability for damages of any kind, including but not limited to personal injuries and property damage, resulting from use of Seller's product. This warranty is expressly in lieu of all other warranties, either express or implied, including any implied warranty as to merchantability or fitness for any particular purpose. Special and consequential damages: In no event shall Seller be liable for any consequential or special damages arising from any breach of these terms and conditions from the use of its products.

## DESIGN TESTING & SPECIFICATIONS

- ANSI/ASME B1.3M Screw Thread Gauging System for Dimensions
- ANSI/ASME B16.10 Face-to-Face and End-to-End Dimensions of Valves
- ANSI/ASME B16.34 Valves-Flanged, Threaded and Welding Ends
- ANSI FCI 70-2 Control Valve Seat Leakage Classifications
- API 608 Metal Ball Valves - Flanged, Threaded and Welding ends
- API 598 Valve Inspection and Testing
- API 6D Pipeline Valves
- ASTM A 194/A193M-96b Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service
- ASTM A 194/A194M-96 Carbon and Alloy Steel Nuts for High Pressure and High Temperature Service

- CSA B51-95 Boiler, Pressure Vessel and Pressure Piping Code
- ISO 9001: 2008
- MTRs (Material Test Report), PMI (Positive Material Identification) and additional non-destructive tests available upon request
- MSS-SP-61 Pressure Testing of Valves
- MSS SP-25 Standard Marking System for Marking Valves, Fittings & Flanges
- NACE MR0103/MR0175: Metals for sulfide stress cracking and stress corrosion cracking resistance in sour oilfield environments
- PED- Directive 97/23/EC: Pressure Equipment Directive (EU)





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