

BELLOWS SEAL VALVES

PATENT PENDING

3/8" Bore Bellows Seal Valve

The bellows seal valve is designed with a metal bellows between the stem and body as the primary seal, which provides a hermetical metal boundary to the process eliminating two leaking paths compared to traditional packed seal valves. Zero fugitive emission is achieved by this configuration. A standard Grafoil™ backup packing and a backseating valve stem provide additional safety. Various bellows seal valve types are available, including needle, block and bleed and double block and bleed. The bellows valve is designed, built and tested in accordance with MSS-SP 130 *Bellows Seals for Instrument Valves*.



Special Features

Metal bellows seal is the primary seal

Backseat and Grafoil packing

Integral stem-bellows-cartridge welding assembly

Unique locking device with non-rotating stem

Monitoring port (1/8" FNPT) on bonnet (optional)

Standard Features

Hydrotested at 150% of rated pressure (shell test). Nitrogen gas tested to 1200 psi.

Seat tightness (zero leakage) verified to 110% of rated pressure. Nitrogen gas tested to 900 psi.

Integral double block and bleed valve body configuration

8 RMS stem finish

Non-rotating stem design with ceramic ball tip

Bellows design cycle, vacuum and helium tested

Pressure component materials sourced from the US, Canada or Europe

Benefits



Provides hermetically metal boundary to process media as valve operated, no fugitive emission



Provides a secondary seal to bellows primary seal



Easy to be replaced at maintenance, cartridge provides protection to bellows



Prevents destructive torsion to the bellows



Indicates the status of the bellows from outside, local or remote

Benefits



Complies with ASME B31.1 & B31.3 shell testing procedures as standard. Ensures structural integrity of valve.



Complies with ASME B31.1 & B31.3 seat testing procedures as standard. Ensures zero leakage at seats for proper calibration.



Eliminates number of leak points of traditional configurations



30-40% less operational torque and less frequent packing adjustments than traditional packed valves



Provides best sealing ability on stem and valve seat and longer service life in abrasive processes



Proven reliability of bellows



Reliable material traceability. MTR's provided with every order for pressure containing components.

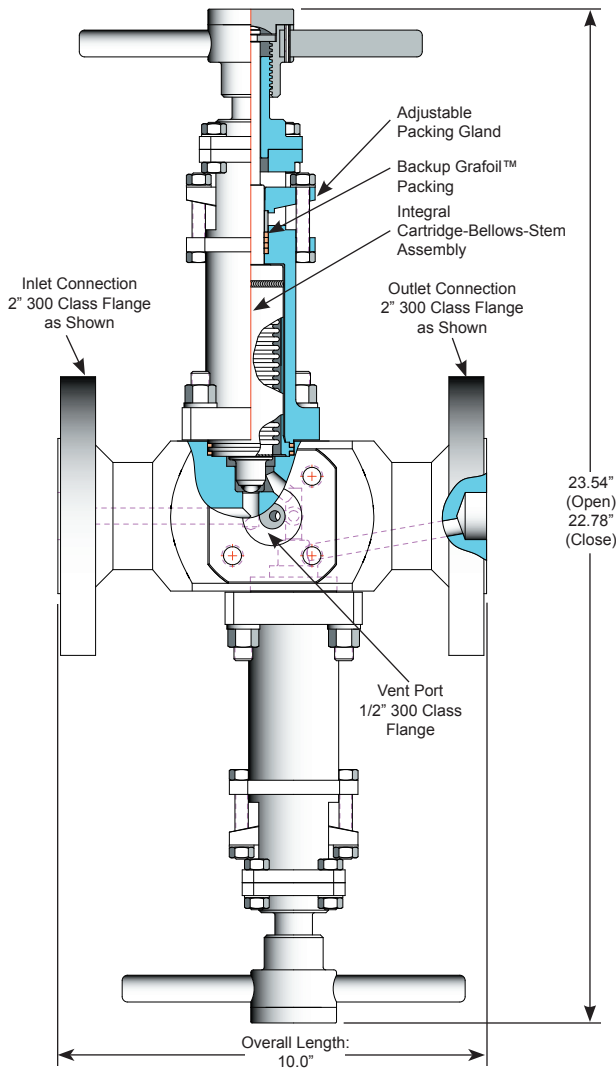


FIG. 1
INLET
CONNECTION
TYPE

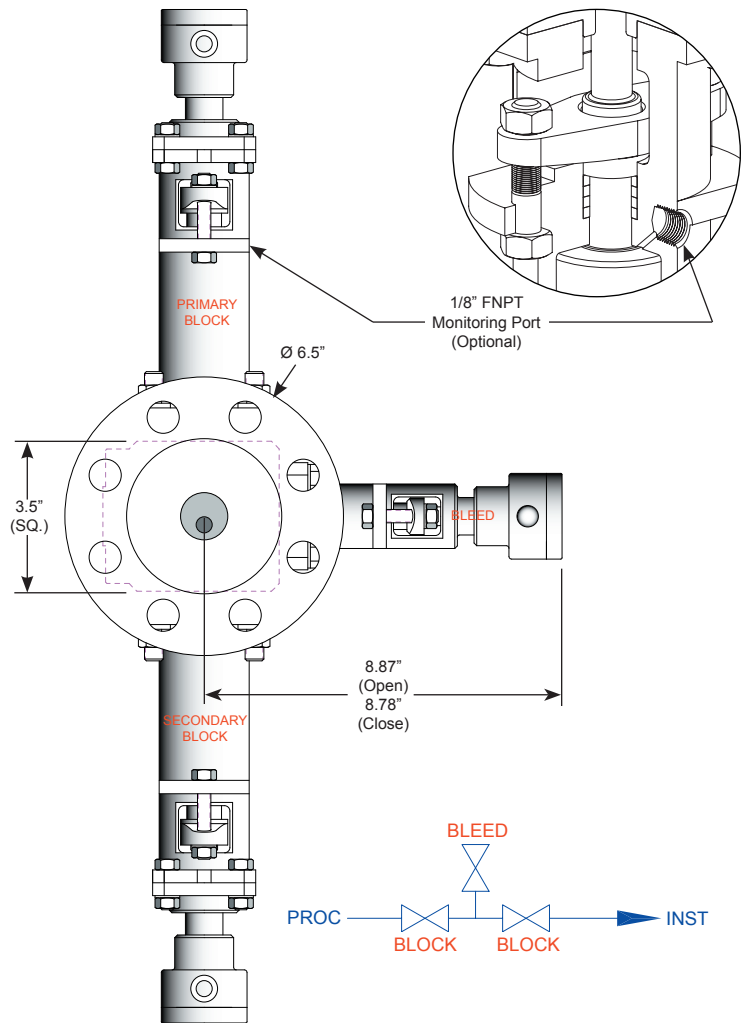
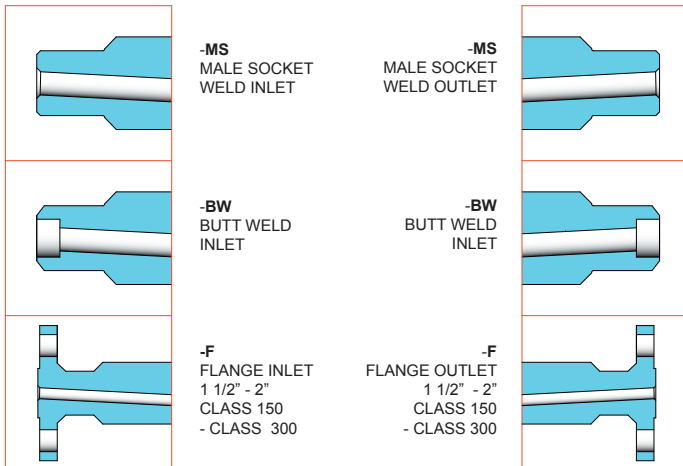


FIG. 2
OUTLET
CONNECTION
TYPE

Specifications:

Type: **P6DBB3BS**, DBB Bellows Seal Valve as Shown, Globe Pattern

Rating: For Valve 800 psi @ 100°F

(5515 kPa @ 38°C)

For 150# Flange 275 psi @ 100°F

(1896 kPa @ 38°C)

For 300# Flange 720 psi @ 100°F

(4964 kPa @ 38°C)

Stem: Non-rotating Ceramic Ball Tip Stems for All Blocks and Bleed

Primary Seal: Hastelloy™ C276 Bellows, Other Material Available, See Page 4

Secondary Packing: Teflon™ or Grafoil™

Seat: Integral

Handle: Non-removable

Bore Size: 3/8"

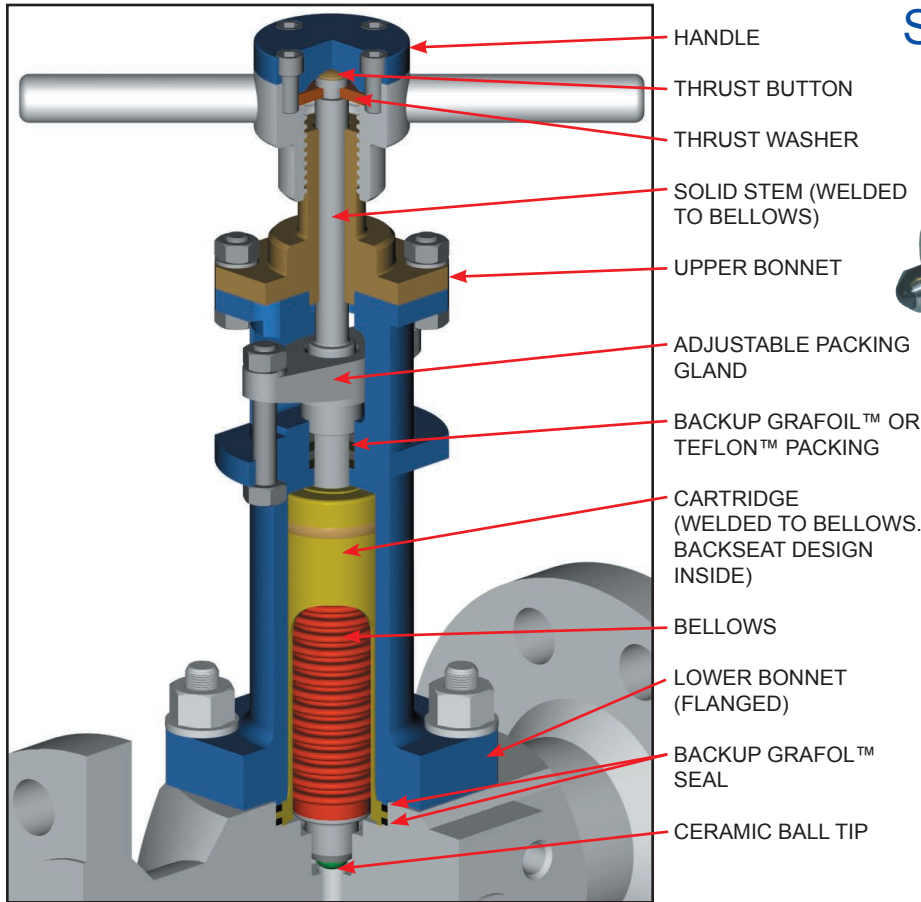
Inlet Connections: See Fig. 1

Outlet Connections: See Fig. 2

Vent Port: 3/8" Bore (2-Bolt Flange)

Weight: 62 lbs

Bellows Seal Bonnet Assembly

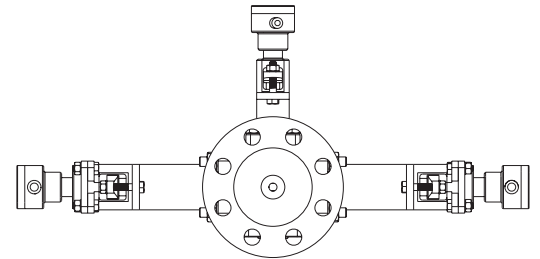


NOTE: Stem-Bellows-Cartridge is an integral assembly, so it's easy to be replaced. The cartridge also provides protection to the bellows

Integral Stem-Bellows-Cartridge



Recommended Installation Layout



NOTE: The vent port is at the lowest point of the valve, minimizing the existence of residual process media within valve

Seal Functions of Bellows Valve

Process media wetted area

Non-process media wetted area

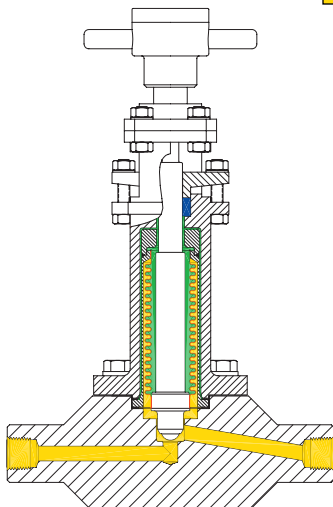


Fig. 1 Valve Opened (Normal working, bellows primary seal)

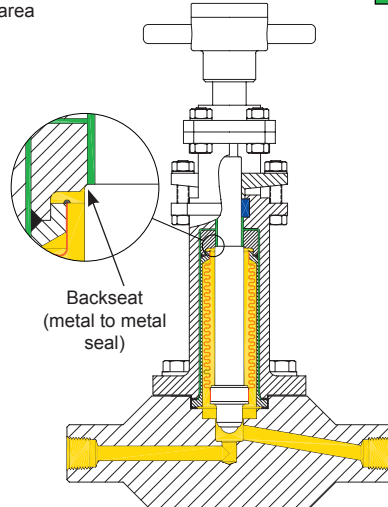


Fig. 2 Valve Backseated (bellows rupture, full open position, backseating provides secondary metal to metal seal)

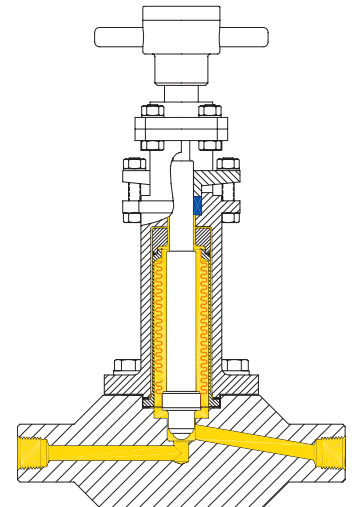


Fig. 3 Valve Opened, Not Backseated (bellows rupture, Grafoil™ packing provides third safety seal. Valve is still functional)

Phoenix	Orifice Size	Type	Qty. of Bellows	Bellows Bonnet	Bellows Pressure	Inlet Size	Inlet Type	Outlet Size	Outlet Type	Valve Material	Packing	Seat	Stem Tip	Stem Type	Bellows Material
P	6=3/8"	N=Needle	1	BS	8H=800 psi CWP	16=1"	MS*=Male Socket weld	Same with inlet, leave blank	Same with inlet, leave blank	SS=ASTM A182 316/316L	T=Teflon™	Integral (leave blank)	Needle Tip Standard (leave blank)	Rotating (leave blank)	SS=AISI 316L/316Ti
		BB=Block & Bleed	2			24=1.5"	FS*=Female Socket weld			S317=ASTM A182 317/317L	G=Grafoil™	B=316SS Ball Tip	NR=Non-rotating	S321=ASTM A182 F321	
		DBB=Double Block & Bleed	3			32=2"	FT=Female Tube Fitting			N4=Monel™ 400		BC=Ceramic Ball Tip		N4=Monel™ 400	
						150=1.5" Flange	BW=Butt Weld			N5=Monel™ 500		BM=Monel™ Ball Tip		N5=Monel™ 500	
						200=2.0" Flange	R150F=150# Raised Face Flange			N6=Inconel™ 625				N6=Inconel™ 625	
							R300F=300# Raised Face Flange			N8=Inconel™ 825				N7=Inconel™ 718	
										N2=Hastelloy™ C276				N2=Hastelloy™ C276	
EXAMPLE: P6DBB3BS8H200R300FSSGBCNR-N2 = Phoenix, 3/8" Orifice, Double Block & Bleed Valve, 3 Bellows Seal Bonnet, 800 psi CWP of Bellows, 2" 300 Class Flange Inlet and Outlet, 316 SS Body, Grafoil™ Packing, Integral Seat, Ceramic Ball, Non-rotating Stem, Hastelloy™ C276 Bellows material															
P	6	DBB	3	BS	8H	200	R300F			SS	G		BC	NR	N2
*For socket weld (SW) connections, specify MS or FS															

Use with Confidence, Phoenix Precision Products Meet the Following Specifications:

- ✓ ASME B31.1 Power Piping
- ✓ ASME B31.3 Process Piping
- ✓ ASME B16.34 Valves - Flanged, Thread, and Welding End
- ✓ API 598 Valve Inspection and Testing
- ✓ MSS SP-25 Standard Marking Systems for Valves, Fittings and Flange Unions
- ✓ MSS SP-99 Instrument Valves
- ✓ MSS SP-105 Instrument Valves for Code Applications
- ✓ MSS SP-130 Bellows Seals for Instrument Valves
- ✓ NACE MR0175/ISO15156 for all 316SS valves and A105CS body/316SS bonnet (SC-Material Code) when in service with less than 50 PPM of chlorides

Seal and Seat Material Temperature Rating

Code	Description	Minimum Temperature	Maximum Temperature
T	Teflon™	-65°F (-54°C)	450°F (232°C)
G	Grafoil™ (SS Body)	-70°F (-56°C)	572°F (300°C)
Note: Grafoil™ is suitable for services in excess of 1000°F in a non-oxidizing environment.			

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