

**Pressure Reducing, Differential and Back Pressure Regulating Valves**

**Spring Loaded • Dome Loaded • Pilot Actuated**



# Burling Valves

- Largest Cv per valve size
  - Possible smaller, more cost effective valve selections
  - Savings of up to 25% possible
- More accurate performance due to balanced plug design
- In-line maintenance
- Soft seat
  - Tighter shutoff
  - Class VI
- High turndown ratio
- Greater rangeability
- Extremely fast response time
- Greater metallurgical selection
- Greater inventories
  - quicker delivery
- Flexibility
- Engineering for specific applications
- Each valve fully tested before shipment

**100% USA manufactured**



## About Burling Valves

Burling Valves traces its background and pedigree to the 1890's with its First Direct Acting Spring-loaded Regulator for a New York utility.

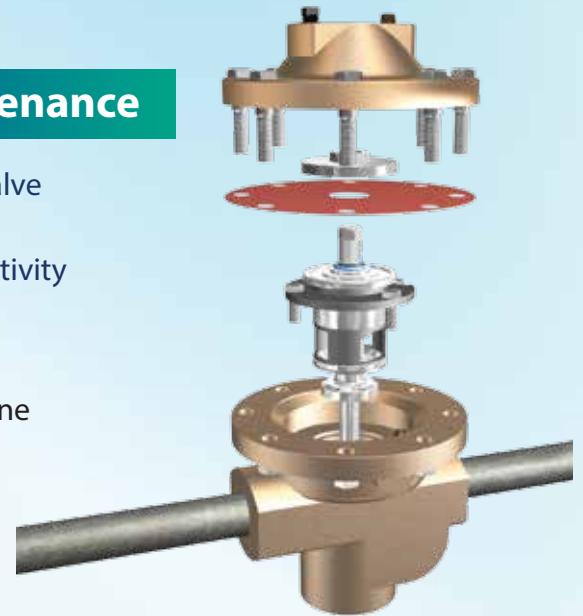
The Burling Family has many years of regulator and control valve design and manufacturing expertise. Advanced technology and precision is seen in all Burling Valve products.

This fast changing marketplace requires understanding and mastering of current and future technology and designs. Both new product development and existing product enhancements ensure that tomorrow's Burling products will continue the Burling tradition of leadership.

Both experienced and new engineers have come to trust Burling's integrity, engineering and manufacturing expertise.

## Ease of Maintenance

- No need to remove valve from pipeline
- Greater online productivity
  - Top entry
  - Quick change trim
  - No disturbing pipeline



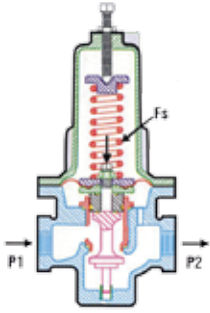
## Markets

- |                    |                 |                           |
|--------------------|-----------------|---------------------------|
| • Chemical         | • HVAC          | • Automotive              |
| • Petrochemical    | • Environmental | • Architectural Fountains |
| • Refineries       | • SemiConductor | • Atmospheric Bulk Gas    |
| • Food             | • Cryogenic     | • Natural Gas             |
| • Pharmaceutical   | • Medical       | • Boilers                 |
| • Power Generation | • OEM           | • Paper                   |
| • Energy           | • Marine        | • General Process         |



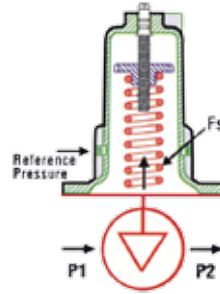


## BS Series

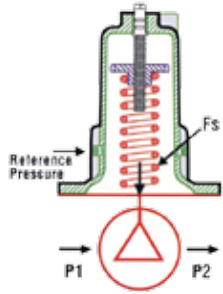


**BS1** (*Pressure Reducing*)  
Simplest regulator design

- Chemical and all simple process applications and industries
- Most fluids and medias

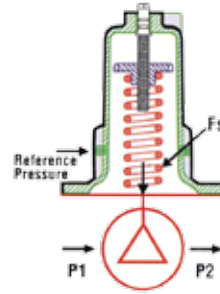


**BS8** (*Positive Differential Back Pressure*)  
By using a positive bias on spring in compression with back pressure trim produces a positive differential back pressure regulator.

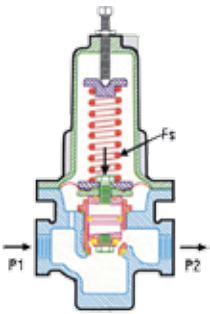


**BS2** (*Pressure Reducing, Differential*)  
Using a sealed differential chamber instead of simple BS1 chamber produces a differential PRV

- Seal pressurization applications
- Spring atomization applications
- Spray tower applications

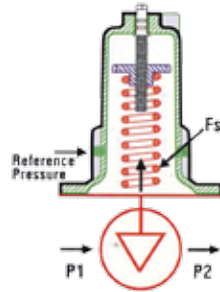


**BS2-3** (*Negative Bias Differential*)  
By placing spring in tension rather than compression produces a negative bias relative to the reference pressure or a negative differential regulator.



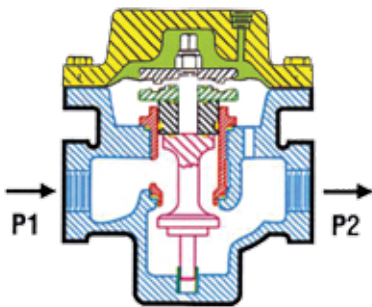
**BS5** (*Back Pressure*)  
Replacing trim with back pressure trim produces simplest back pressure regulator

- Pump discharge applications
- Filter applications
- Relief valve



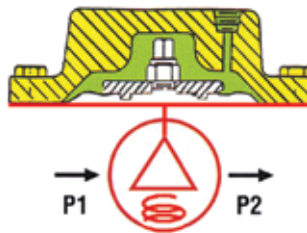
**BS8-3** (*Negative Differential Back Pressure*)  
Similarly, by utilizing the spring in a negative or tension mode along with back pressure trim creates a negative differential back pressure regulator.

## BD Series



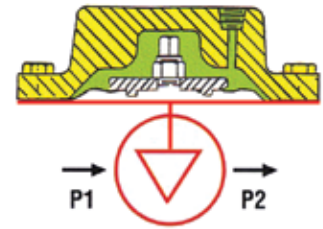
**BD3**  
*Pressure Reducing*

Simplest dome-loaded regulator or 1:1 "mimic" valve. Loading signal essentially equals P2.



**BD4**  
*Pressure Reducing with Return Spring*

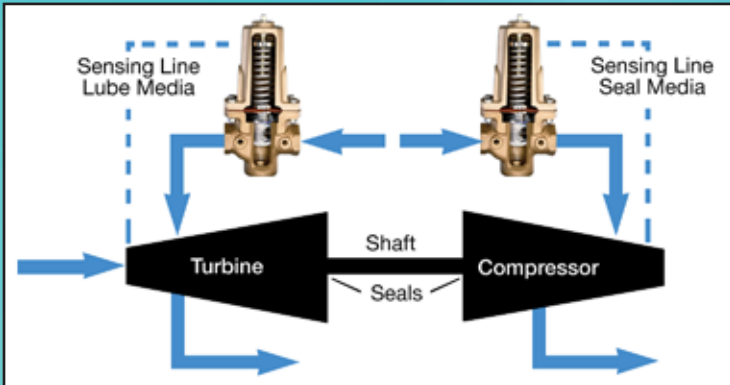
Same as BD3 except with a bottom return spring for proportional band control. Used when a "Closed Loop" or feedback to regulator is generated.



**BD6**  
*Back Pressure*

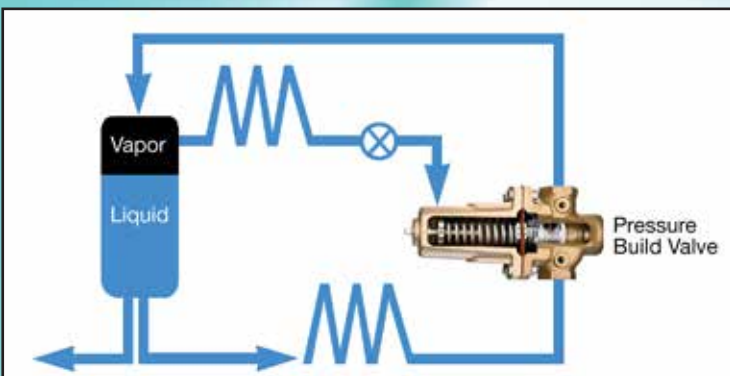
By using back pressure trim instead of standard trim, a dome loaded back pressure valve is created.

# Typical Applications



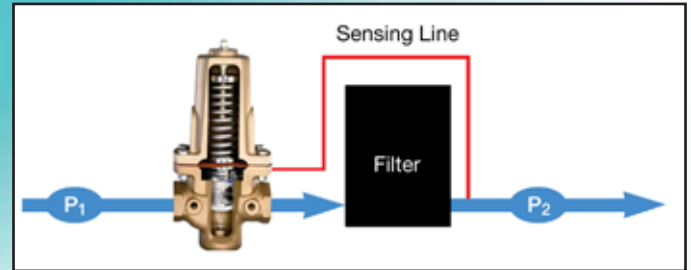
## SERIES BS - SEAL PRESSURIZATION

Spring Loaded Differential Pressure Regulators are used to maintain lubrication or seal media on rotating or reciprocating equipment. The differential is maintained relative to internally sensed turbine or compressor pressures.



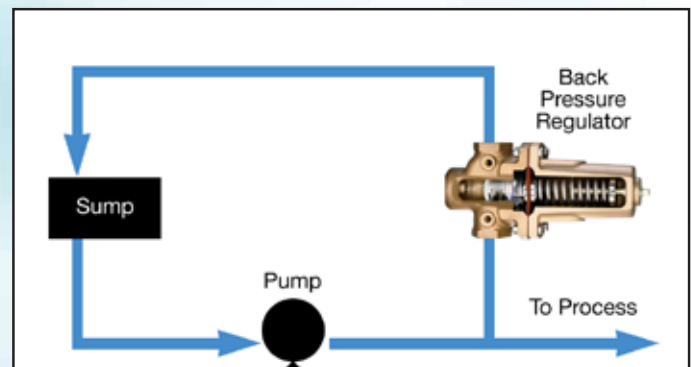
## SERIES BS - CRYOGENIC PRESSURE BUILD

Pressure building regulators used to maintain pressure in vapor space above cryogenic liquid in Dewar vessels. By using a light spring with low "droop" assisted by gas pressure, a highly accurate pressure of 275 psig or more is attained. Set-point is capable of accuracies of  $\pm 2$  psig.



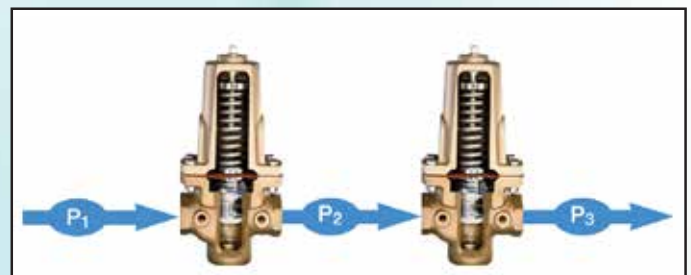
## SERIES BS – CONSTANT FILTER DISCHARGE

By using a spring loaded regulator with remote sensing, constant discharge pressure after a filter can be achieved regardless of cake buildup.



## SERIES BS - CONSTANT PUMP DISCHARGE PRESSURE

By using a simple spring loaded back pressure regulator, constant pump discharge pressure can be generated regardless of demand.



## SERIES BS – PRESSURE REDUCTION

Placing two or more Spring Loaded regulators in series for Pressure let-down will provide excellent accuracy, if flows are relatively constant. Valves are designed to fall-open position and minimization of "supply-line" effect.

## General Specifications:

**Sizes:** 1/2 in. through 4 in.

**Body Materials:** Cast Iron, Carbon Steel, Bronze, Stainless Steel,

\*Hastelloy, \*Alloy 20. \*Consult Factory

**Trim Materials:** 17-4 PH or 316L S.S., Monel, Hastelloy, others

**Diaphragm Materials:** 6-ply special composition (PTFE, Viton) PTFE,

Viton, Neoprene, Buna N, EPDM, \*Fluorosilicone, Beryllium Copper,

Stainless Steel, \*Alloy 20. \*Consult Factory

**Seats:** Extensive selection includes: Polyurethane, PTFE, Viton, others

**Cv Rating:** Controllable Cv Range, 4 to 220

**Set Points:** To Inches of Water Column

**Max. Inlet & Outlet Pressure:** 3000 psig @100°F (material specific)

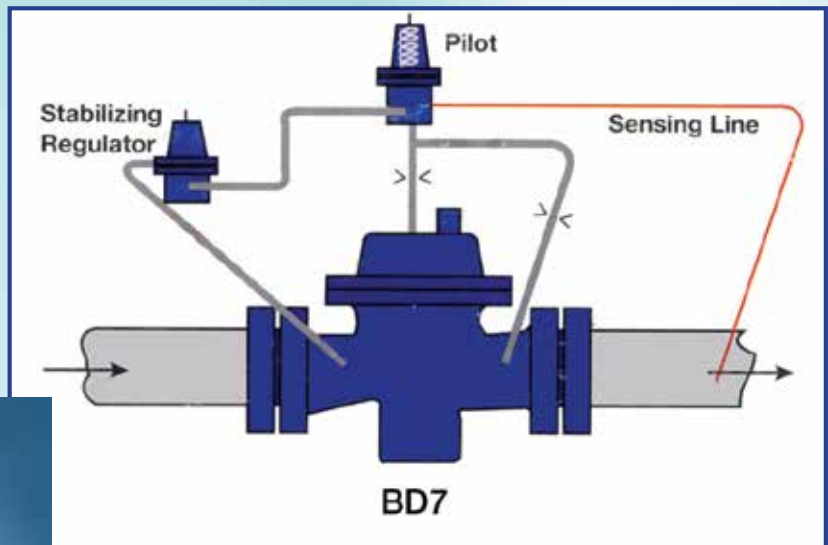
**Actuators:** Elastomeric Diaphragm, Metal Diaphragm or Piston Actuator

**Temperature Limits:** -425° to 480°F

## Dome Loaded Regulators with Pilots

Accuracy of  $\pm 1-2$  psig is achievable with dome loaded regulators.

If greater accuracy is required, pilot operated dome loaded regulators are utilized if possible. Since pilots are narrow band proportional controllers, accuracies of 2"-3" of W.C. are possible. Pilots can be dome loaded as well as spring loaded.



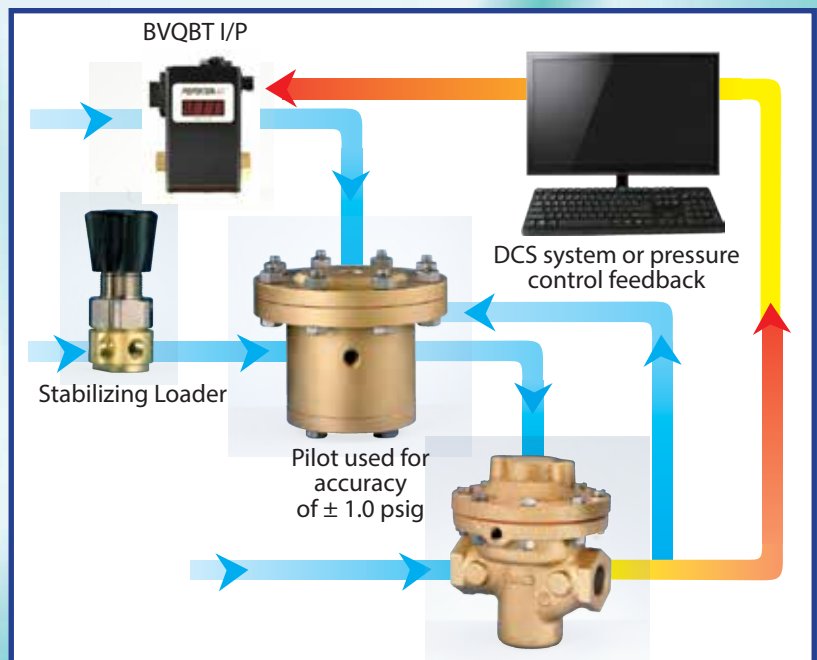
Typical pilot actuated dome loaded regulator for regulator accuracies of  $\pm 0.1-0.2$  psig.

## Dome Loaded Regulators as Control Valves

With the selection of the sensing element such as a transducer, pH meter, level control or other, coupled with a controller and I/P (extended range, if necessary) the functionality of a control valve is accomplished.

### Advantages Over Control Valves

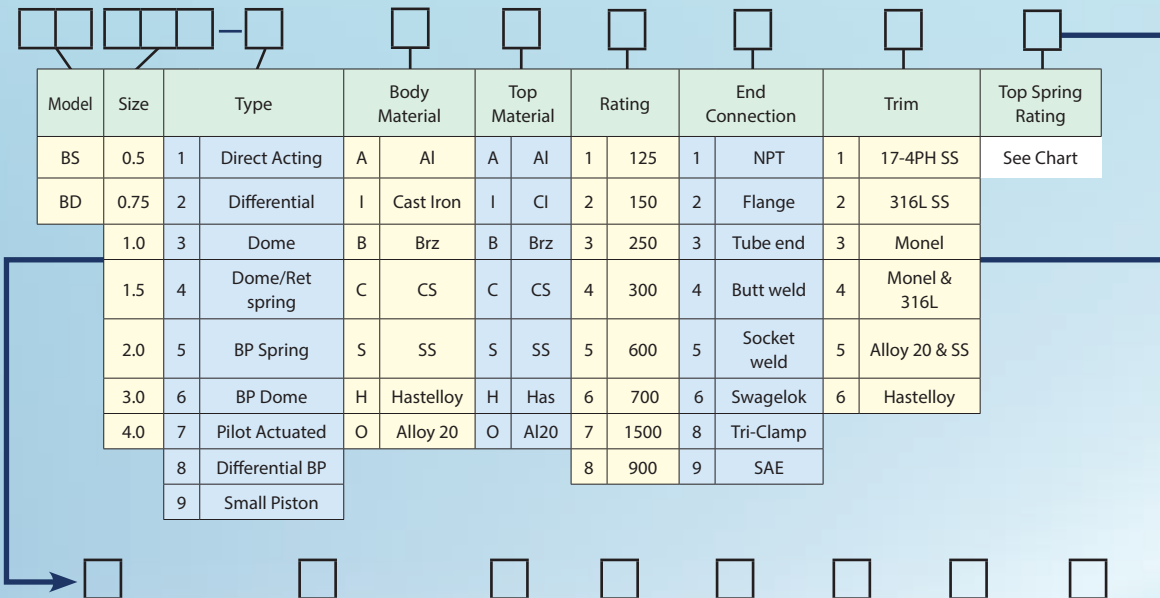
- Quicker dynamic response (10 cycles per second)
- More compact design (over 30% smaller)
- No fugitive emissions
- Higher turndown ratio 1000:1
- Generally less expensive than control valves in both cryogenics and industrial applications (approximately 30% less expensive)



**End Connections:** Threaded, Flanged, Socket Weld, Butt Weld, Tube, Tri-Clamp, DIN, BSP, Others  
**Turn-Down Ratio:** 1000 : 1  
**Sensitivity:** 1/8 in. W.C.  
**Dynamic Response:** 10 cps (cycles per second)  
**Trim:** Top Entry, Balanced, Quick-Change, Single Seat  
**Inlet Sensitivity Effect:** Minimal due to balanced design.

Outlet pressure changes by 3 to 8 psig for every 100 psig variation in inlet pressure, either directly or inversely.  
**Sensing:** Internal or external  
**Ratio-Loaded Configuration:** Available for controlling set point when control signal is too low.

# Typical Burling Valve Product Numbering System



Model	Size	Type		Body Material		Top Material		Rating		End Connection		Trim		Top Spring Rating
BS	0.5	1	Direct Acting	A	Al	A	Al	1	125	1	NPT	1	17-4PH SS	See Chart
BD	0.75	2	Differential	I	Cast Iron	I	Cl	2	150	2	Flange	2	316L SS	
	1.0	3	Dome	B	Brz	B	Brz	3	250	3	Tube end	3	Monel	
	1.5	4	Dome/Ret spring	C	CS	C	CS	4	300	4	Butt weld	4	Monel & 316L	
	2.0	5	BP Spring	S	SS	S	SS	5	600	5	Socket weld	5	Alloy 20 & SS	
	3.0	6	BP Dome	H	Hastelloy	H	Has	6	700	6	Swagelok	6	Hastelloy	
	4.0	7	Pilot Actuated	O	Alloy 20	O	Al20	7	1500	8	Tri-Clamp			
		8	Differential BP					8	900	9	SAE			
		9	Small Piston											

**ABBREVIATIONS**  
 FK=Fluorosilicone  
 NBR=Buna-N  
 PTFE=Virgin TFE  
 BC=Neoprene  
 RTFE=Reinforced TFE  
 EPDM=For Membrane

Seat		Membrane				Dynamic Seal	Static Seal	Lower Return Spring	Trim Variations		Sensing		Flow	Special							
1	Polyurethane	0	none	A	PTFE Faced Viton	1	PTFE U-Cup	2	Buna-N	0	No Spring	1	Full	1	Internal	1	Normal	0	None	9	6" Flange on 4" body
2	PTFE	1	Neoprene	B	PTFE Faced Buna-N	2	RTFE U-Cup	3	Viton	1	1-3	2	Reduced	2	External	2	Reverse	1	1/4" Body Tap Gauges	A	Low Pressure
3	RTFE	2	PTFE 6 Ply	C	PTFE Faced EPDM	3	POLY U-Cup	4	Fluoro-silicone	2	2-7	3	Ratio					3	Negative Differential	B	Face to Face
4	Kel-F	3	Viton	D	PTFE Faced Neoprene			5	EPDM	3	3-15							4	Oxygen Cleaned	C	1/2" NPT Dome Tap
5	70 Durometer Polyurethane	4	EPDM	E	Metal 17-7			6	PTFE									6	Tamper Proof Cap		
6	EPDM	5	Metal 316	F	Metal BeCU													7	Hand wheel		
7	Viton	6	Fluoro-Silicone	G	Viton Reduced Thickness													8	Gauge		

## Available Top Spring Ranges (psi)

Top-Spring Range for Direct Acting Regulators				
Symbol	1/2" to 1"	1-1/2"	2"	3", 4"

### Standard Spring Ranges

B	0.5 to 5			
1	1 to 10	1 to 10	1 to 5	1 to 10
2	2 to 20	5 to 20	4 to 15	5 to 20
3	10 to 35	15 to 45	10 to 30	10 to 40
4	20 to 80	10 to 70	15 to 50	10 to 70
5	30 to 150	40 to 125	30 to 90	40 to 125
6	70 to 200	70 to 200	50 to 150	100 to 500
7	100 to 300			

### Heavy Springs Ranges (requires heavy spring chamber)

8	200 to 650	100 to 400	80 to 300	
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### Negative Bias Spring Range

9	-1 to 20	-2 to 20	-1 to 15	
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Expedite Possibilities and Custom Solutions Available

MAX Cv*	
1/2"	4
3/4"	8
1"	15
1-1/2"	30
2"	60
3"	120
4"	220

\*Max Cv values are with full trim and elastomeric materials

# Sizing a Regulator Correctly

The following data is required for proper regulator sizing

Company		Name	
Email		Phone Number	
Fluid (media)		Specific Gravity <sup>1</sup>	
Temperature (min-max)		Viscosity <sup>1</sup>	
Function (Pressure Reducing, Back Pressure, Differential or Other - please specify)			
Flow (min) <sup>2</sup>		Flow (norm)	Flow (max) <sup>2</sup>
P1 (min) <sup>2</sup>		P1 (norm)	P1 (max) <sup>2</sup>
P2 (min) <sup>2</sup>		P2 (norm)	P2 (max) <sup>2</sup>

## Additional (helpful) Information

Application Description			
Regulation Accuracy		In/Out Pipe Size   Schd	Schd
Auxiliary Air Available		Pipe Material	
Body Material   Cv	Cv	Trim Material	
Soft Goods Materials		End Connection	

<sup>1</sup>This information is only required if we do not have information available on the fluid specified (please contact factory)

<sup>2</sup>If regulator will always be operating at normal conditions, min and max values can be omitted.

Example Full Part Number: **BS1.0-1CC5114-113201110**

Example Replacement Kit Part Number: **100BS1.0-11132-XXX**

## Burling Valve Replacement Kit Part Numbering

Always	Model	Size	Type	Membrane			Dynamic Seal	Static Seal	Special	Backpressure Only DISC (same as seat)		Differential Only Chamber Seals and Gasket					
100	BS	0.5	1 Polyurethane	0	None	A	PTFE Faced Viton	1	PTFE U-Cup	2	Buna-N	1	O2 Cleaned	1	Polyurethane	2	Buna-N
	BD	0.75	2 PTFE	1	Neoprene	B	PTFE Faced Buna-N	2	RTFE U-Cup	3	Viton	x	None	2	PTFE	3	Viton
		1.0	3 RTFE	2	PTFE	C	PTFE Faced EPDM	3	Poly U-Cup	4	Fluoro-Silicone			3	RTFE	4	Fluoro-Silicone
		1.5	4 Kel-F*	3	Viton	D	PTFE Faced Neoprene			5	EPDM			4	Kel-F	5	EPDM
		2.0	5 70 Durometer Polyurethane	4	EPDM	E	Metal (17-7)*			6	PTFE			x	None	x	None
		3.0		5	Metal (316SS)*	F	Metal (BeCu)*										
		4.0		6	Fluoro-Silicone	G	Viton (reduced thickness)										
				7	Buna-N												

\*Note that all repair kits with a metal membrane will have PTFE gaskets



# Burling Valve *The Regulator Company*

PRESSURE REDUCING • DIFFERENTIAL • BACK PRESSURE



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