

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

MADE IN USA!



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.

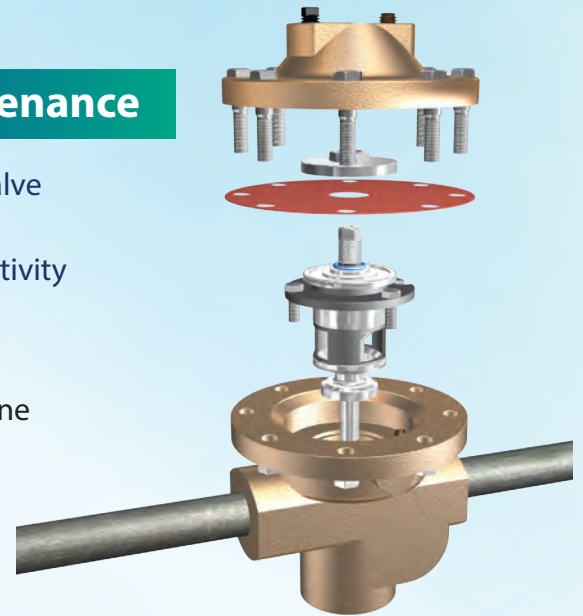
The Burling Family has many years of regulator and control valve design and manufacturing expertise. Advanced technology and precision is seen in all Burling Valve products.

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

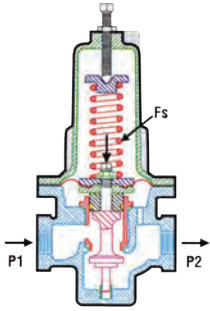


Markets

- | | | |
|--------------------|-----------------|---------------------------|
| • 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 |

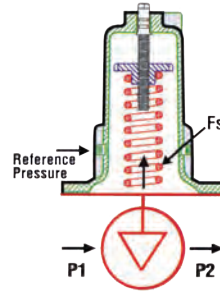


BS Series

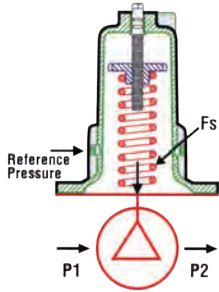


BS1 (Pressure Reducing)
Simplest regulator design

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

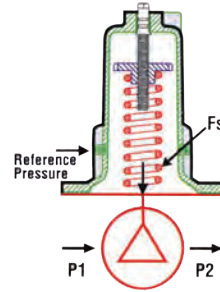


BS8 (Positive Differential Back Pressure)
By using a positive bias on spring in compression with back pressure trim produces a positive differential back pressure regulator.

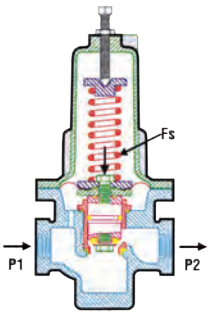


BS2 (Pressure Reducing, Differential)
Using a sealed differential chamber instead of simple BS1 chamber produces a differential PRV

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

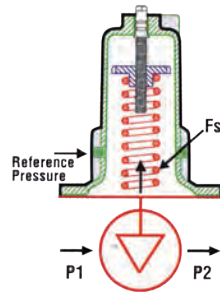


BS2-3 (Negative Bias Differential)
By placing spring in tension rather than compression produces a negative bias relative to the reference pressure or a negative differential regulator.



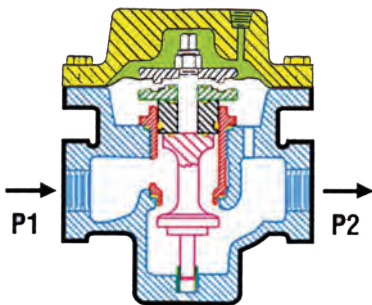
BS5 (Back Pressure)
Replacing trim with back pressure trim produces simplest back pressure regulator

- Pump discharge applications
- Filter applications
- Relief valve



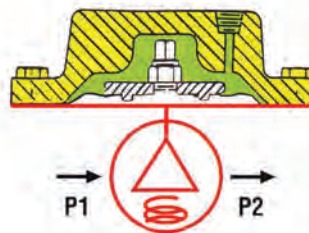
BS8-3 (Negative Differential Back Pressure)
Similarly, by utilizing the spring in a negative or tension mode along with back pressure trim creates a negative differential back pressure regulator.

BD Series



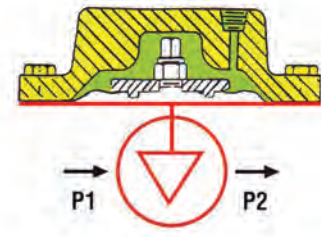
BD3
Pressure Reducing

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



BD4
Pressure Reducing with Return Spring

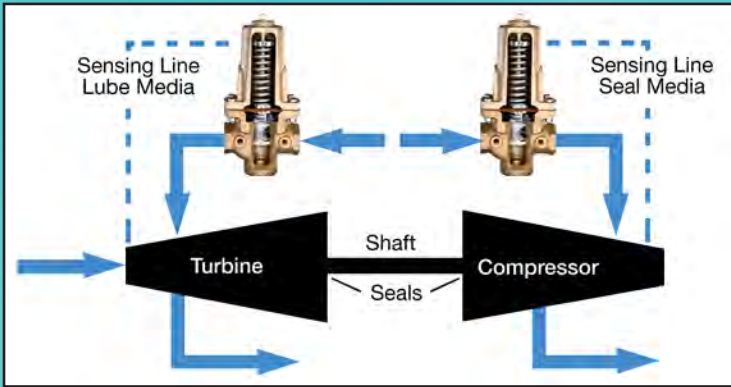
Same as BD3 except with a bottom return spring for proportional band control. Used when a "Closed Loop" or feedback to regulator is generated.



BD6
Back Pressure

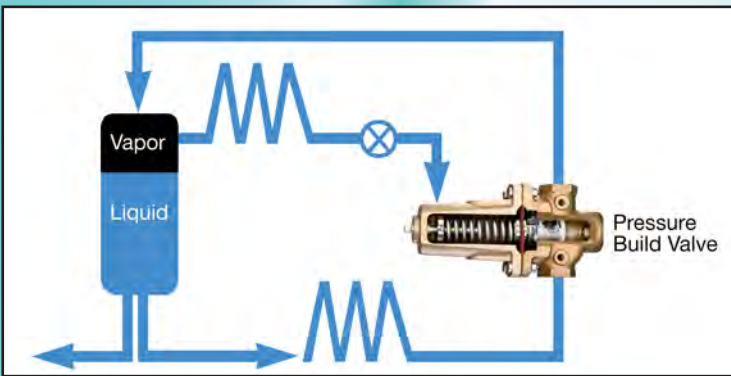
By using back pressure trim instead of standard trim, a dome loaded back pressure valve is created.

Typical Applications



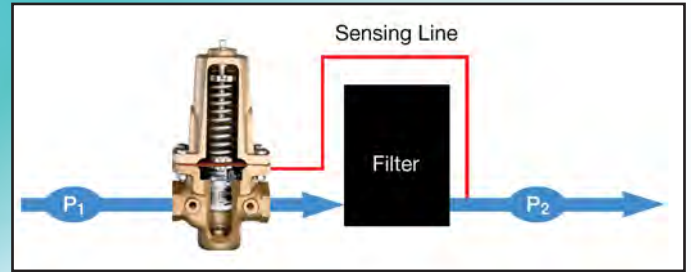
SERIES BS - SEAL PRESSURIZATION

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.



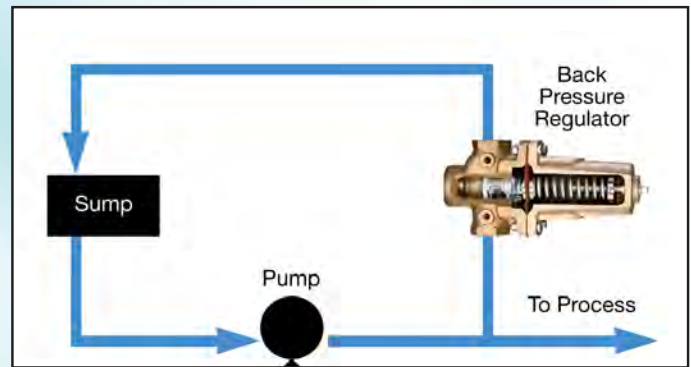
SERIES BS - CRYOGENIC PRESSURE BUILD

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 ± 2 psig.



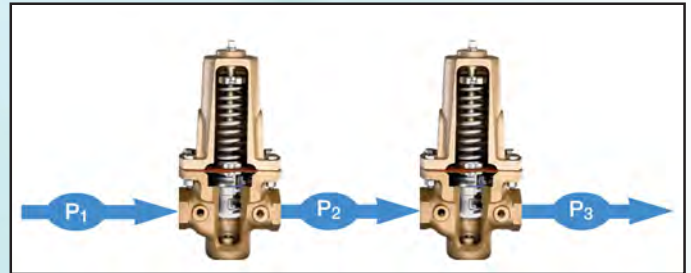
SERIES BS – CONSTANT FILTER DISCHARGE

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*)

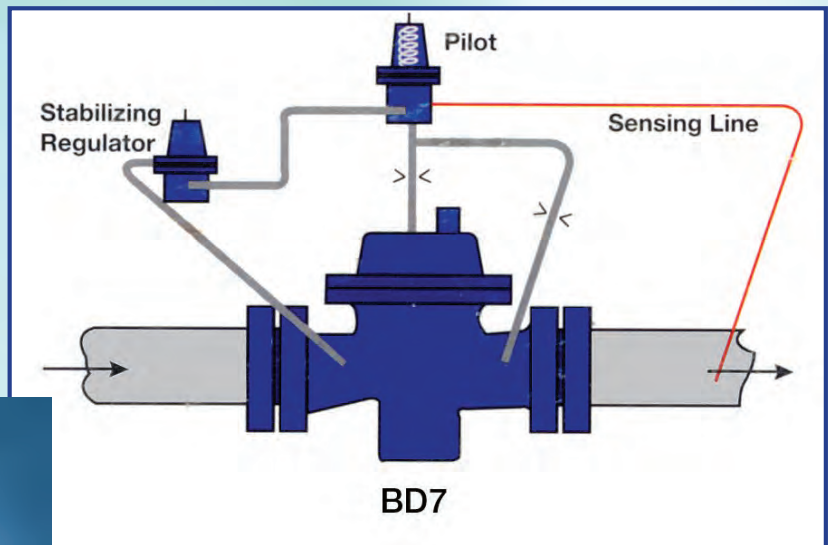
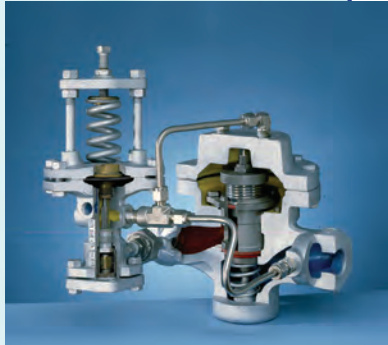
Actuators: Elastomeric Diaphragm, Metal Diaphragm or Piston Actuator

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.



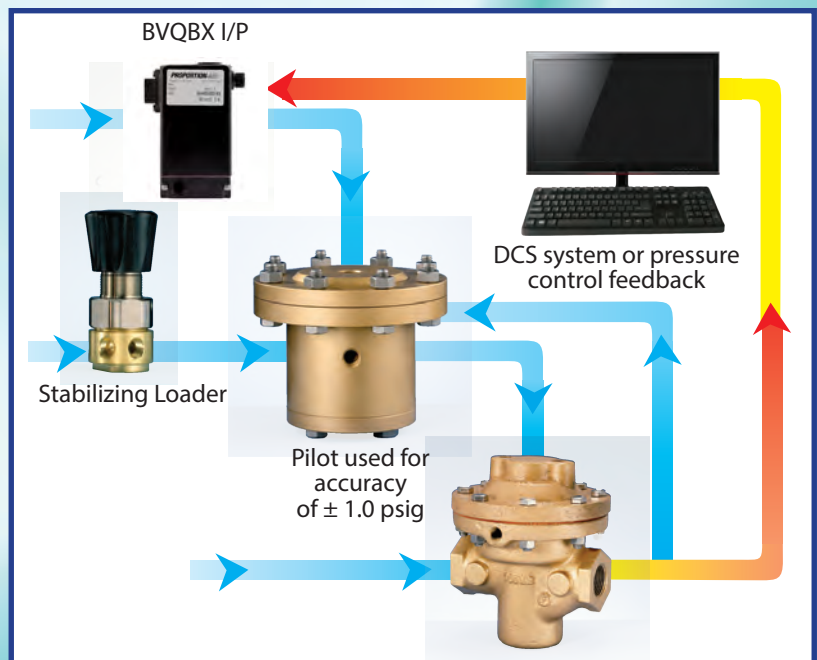
Typical pilot actuated dome loaded regulator for regulator accuracies of $\pm 0.1-0.2$ psig.

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.

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| Model | Size | Type | Body Material | Top Material | Rating (psi) | End Connection | Trim | Top Spring Range | Seat | Membrane | Dynamic Seal | Static Seal | Return Spring | Trim Variation | Sensing | Flow | Special |
|-----------|-----------|----------------------------|-----------------|--|--------------|-------------------|----------------------------|------------------|-----------------------------|--------------------|----------------------|-------------------|---------------|----------------|--------------|----------------------|-----------------------|
| BS Spring | 0.5, 1/2" | Direct Acting | Aluminum | Aluminum | 1 125 | NPT | 1 17-4 PH SS | 0 None | 1 Polyurethane | 0 None | 1 PTFE U-Cup | 2 Buna-N | 0 None | 0 See Table B | *Non-Sensing | 1 Normal | None |
| BD Dome | .75, 3/4" | Differential | Cast Iron | *Cast Iron | 2 150 | Flange | 2 316 SS | See Table A | 2 PTFE | 1 Neoprene | 2 RTFE U-Cup | 3 Viton | 1 1-3 PSI | 1 | Internal | 2 Reverse | 1 1/4" Body Taps |
| | 1.0, 1" | Dome | Bronze | *Bronze | 3 250 | Tube End | 3 Monel | | 3 RTFE | 2 PTFE 6-Ply | 3 Polyurethane U-Cup | 4 Fluoro-Silicone | 2 2-7 PSI | 2 | External | 3 | Negative Differential |
| | 1.5, 1.5" | Dome/Return Spring | Carbon Steel | Carbon Steel | 4 300 | Burr Weld | 4 Hybrid (Monel & 316L) | | 4 Kel-F | 3 Viton | 4 Viton U-Cup | 5 EPDM | 3 3-15 PSI | 3 | Ratio | 4 | Oxygen Cleaned |
| | 2.0, 2" | Back Pressure Spring | Stainless Steel | Stainless Steel | 5 600 | Socket Weld | 5 Alloy 20 Stainless Steel | | 5 70 Durometer Polyurethane | 4 EPDM | 5 EPDM U-Cup | 6 PTFE | | | | 6 | Tamper-Proof Cap |
| | 3.0, 3" | Back Pressure Dome | Hastelloy | Hastelloy | 6 700 | Swagelok Fittings | 6 Hastelloy | | 6 EPDM | 5 Metal (316SS) | 6 Nitrile U-Cup | | | | 7 | Handwheel | |
| | 4.0, 4" | Pilot Actuated | | *BD only, please select Carbon Steel or Stainless Steel for BS Spring Chambers | 7 1500 | *Tri-Clamp | | | 7 Viton | 6 Fluoro-Silicone | 7 TRM U-Cup | | | | 8 | Gauge | |
| | | Back Pressure Differential | | | 8 900 | SAE | | | 8 Nitrile | 7 | | | | | 9 | 6" Flange on 4" Body | |
| | | Dome/Small Piston | | | | | | | 9 TRM | A PTFE Faced Viton | | | | | A | Low Pressure | |

Let multiple options in alphabetical order

*Tri-Clamp will use a body that is one size smaller than closer (ex. 632.0 will use 1.5" body)

Color Key

- = Requires Adder Fee
- = Consult Factory for Pricing & Availability
- = Low Pressure: Consult Factory

Table A: Top Spring Rating (psi)

| Standard Spring Ranges | | | | |
|------------------------|----------------|-----------|-----------|------------|
| # | 0.5, .75 & 1.0 | 1.5 | 2.0 | 3.0 & 4.0 |
| 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 | | | |
| B | 0.5 to 5 | | | |

Heavy Spring Ranges (Requires Heavy Spring Chamber)

| # | 0.5, .75 & 1.0 | 1.5 | 2.0 | 3.0 & 4.0 |
|---|----------------|------------|-----------|-----------|
| 8 | 200 to 650 | 100 to 400 | 80 to 300 | |

Negative Bias Spring Ranges

| # | 0.5, .75 & 1.0 | 1.5 | 2.0 | 3.0 & 4.0 |
|---|----------------|-----------|-----------|-----------|
| 9 | -1 to 20 | -2 to 20 | -1 to 15 | |
| A | -20 to 50 | -20 to 50 | -20 to 50 | -20 to 40 |

Table B: Trim Variation & Cv Selection

| Size | Elast. Membrane Press. Reducing | | Elast. Membrane Backpressure | | Metal Membrane All Types | |
|------|---------------------------------|-------|------------------------------|------|--------------------------|-------|
| | # | Cv | # | Cv | # | Cv |
| 0.5 | 1 | 4.0 | 1 | 4.0 | 1 | 4.0 |
| | 2 | 3.0 | 2 | 3.0 | 2 | 3.27 |
| | 3 | 2.4 | 3 | 2.0 | 3 | 2.64 |
| | 4 | 1.5 | 4 | 1.0 | 4 | 1.98 |
| | 5 | 0.60 | | | 5 | 1.4 |
| | 6 | | | | 6 | 1.12 |
| | 7 | | | | 7 | 0.70 |
| | 8 | | | | 8 | 0.28 |
| .75 | 1 | 8.0 | 1 | 8.0 | 1 | 5.0 |
| | 2 | 7.01 | 2 | 4.0 | 2 | 3.27 |
| | 3 | 5.66 | 3 | 3.0 | 3 | 2.64 |
| | 4 | 4.25 | 4 | 2.0 | 4 | 1.98 |
| | 5 | 3.0 | 5 | 1.0 | 5 | 1.4 |
| | 6 | 2.4 | | | 6 | 1.12 |
| | 7 | 1.5 | | | 7 | 0.70 |
| | 8 | 0.60 | | | 8 | 0.28 |
| 1.0 | 1 | 15.0 | 1 | 12.0 | 1 | 7.0 |
| | 2 | 11.82 | 2 | 4.0 | 2 | 5.52 |
| | 3 | 7.01 | 3 | 3.0 | 3 | 3.27 |
| | 4 | 5.66 | 4 | 2.0 | 4 | 2.64 |
| | 5 | 4.25 | 5 | 1.0 | 5 | 1.98 |
| | 6 | 3.0 | | | 6 | 1.4 |
| | 7 | 2.4 | | | 7 | 1.12 |
| | 8 | 1.5 | | | 8 | 0.70 |
| 1.5 | 1 | 30.0 | 1 | 24.0 | 1 | 9.0 |
| | 2 | 15.0 | | | 2 | 4.5 |
| | 3 | 12.0 | | | 3 | 3.6 |
| | 4 | 9.0 | | | 4 | 2.7 |
| | 5 | 6.0 | | | 5 | 1.8 |
| | 6 | 4.5 | | | | |
| | 7 | 3.0 | | | | |
| | 8 | 1.5 | | | | |
| 2.0 | 1 | 60 | 1 | 48 | 1 | 15 |
| | 2 | 47 | 2 | 16 | 2 | 11.75 |
| | 3 | 30 | 3 | 12 | 3 | 7.5 |
| | 4 | 20 | 4 | 8 | 4 | 5.0 |
| | 5 | 15 | 5 | 4 | 5 | 3.75 |
| | 6 | 10 | | | | |
| | 7 | 7.5 | | | | |
| | 8 | 4.5 | | | | |
| 3.0 | 1 | 120 | 1 | 120 | 1 | 60 |
| | 2 | 50 | | | 2 | 25 |
| | 3 | 40 | | | 3 | 20 |
| | 4 | 30 | | | 4 | 15 |
| | 5 | 20 | | | 5 | 10 |
| | 6 | 15 | | | | |
| | 7 | 10 | | | | |
| | 8 | 5 | | | | |
| 4.0 | 1 | 220 | 1 | 175 | 1 | 80 |
| | 2 | 50 | | | 2 | 18.18 |
| | 3 | 40 | | | 3 | 14.5 |
| | 4 | 30 | | | 4 | 10.9 |
| | 5 | 20 | | | 5 | 7.3 |
| | 6 | 15 | | | | |
| | 7 | 10 | | | | |
| | 8 | 5 | | | | |

Sizing a Regulator Correctly

The following data is required for proper regulator sizing

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

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 | |

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

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

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| Prefix | Model | Size | | Type | Seat | Membrane | Dynamic Seal | Static Seal | Special | Disc* | Chamber Seals & Gasket** |
|------------------------------|--------|-----------------------------|------------------------|-----------------------------|-------------------|-----------------|----------------------|-------------------|------------------|-----------------|--------------------------|
| BS | Spring | 0.5 | 1/2" | 1 Direct Acting | 1 Polyurethane | 0 None | 1 PTFE U-Cup | 2 Buna-N | 1 Oxygen Cleaned | 1 Polyurethane | 2 Buna-N |
| | BD | Dome | .75 | 3/4" | 2 Differential | 2 PTFE | 1 Neoprens | 2 RTFE U-Cup | 3 Viton | 2 High Pressure | 2 PTFE |
| 1.0 | | | 1" | 3 Dome | 3 RTFE | 2 PTFE 6-Ply | 3 Polyurethane U-Cup | 4 Fluoro-Silicone | X None | 3 RTFE | 4 Fluoro-Silicone |
| 1.5 | | 1-1/2" | 4 Dome/Return Spring | 4 Kel-F | 3 Viton | 4 Viton U-Cup | 5 EPDM | | 4 Kel-F | 5 EPDM | |
| 2.0 | | 2" | 5 Back Pressure Spring | 5 70 Durometer Polyurethane | 4 EPDM | 5 EPDM U-Cup | 6 PTFE | | X None | X None | |
| 3.0 | | 3" | 6 Back Pressure Dome | 6 EPDM | 5 Metal (316SS)* | 6 Nitrile U-Cup | | | | | |
| 4.0 | | 4" | 7 Pilot Actuated | 7 Viton | 6 Fluoro-Silicone | 7 TFM | | | | | |
| 8 Back Pressure Differential | | 8 Nitrile | 7 Buna-N | | | | | | | | |
| 9 Dome/Small Piston | 9 TFM | A PTFE Faced Viton | | | | | | | | | |
| | | B PTFE Faced Buna-N | | | | | | | | | |
| | | C PTFE Faced EPDM | | | | | | | | | |
| | | D PTFE Faced Neoprene | | | | | | | | | |
| | | E Metal (17-7) | | | | | | | | | |
| | | F Metal (BaCu) | | | | | | | | | |
| | | G Viton (Reduced Thickness) | | | | | | | | | |
| | | H Alloy 20 | | | | | | | | | |
| | | I Monel | | | | | | | | | |
| | | J PTFE 5-Ply | | | | | | | | | |

*Type 5, 6, 8 Only **Type 2, 8 Only

Color Key

- [Green Box] = Requires Adder Fee
- [Grey Box] = Consult Factory for Pricing & Availability
- [Blue Box] = Low Pressure: Consult Factory

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

Expedite Possibilities and Custom Solutions Available

Example Full Part Number: **BS1.0-1CC5114-113201110**
 Example Replacement Kit Part Number: **100BS1.0-11132-XXX**

Burling Valve *The Regulator Company*

PRESSURE REDUCING • DIFFERENTIAL • BACK PRESSURE



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