

### Application

The Zurn Wilkins Model ZW209 Pilot Operated Pressure Reducing Valve is designed for many applications where the reduction of high inlet pressures to safe and stable outlet pressure is required. The pilot assembly reacts to changes in downstream pressure allowing the main valve to modulate between the closed and open position ensuring a constant downstream set pressure. Once the downstream pressure reaches the pilot setting, the main valve will seal shut preventing damage downstream. Pressure regulation is not dependent upon flow rate, resulting in minimal pressure loss through the valve. In addition the Model ZW209 comes standard with epoxy coating internally and externally for corrosion protection, as well as isolation valves and pressure gauges for quick and easy maintenance or repair.

### Standards Compliance:

- ANSI/AWWA C530
- Meets the requirements of NSF/ANSI 61\*  
\*(0.25% MAX. WEIGHTED AVERAGE LEAD CONTENT)

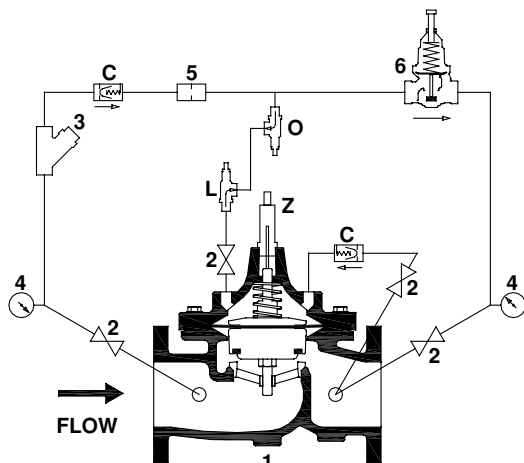
### Materials

|                   |                         |
|-------------------|-------------------------|
| Main Valve Body   | Ductile Iron ASTM A536  |
| Main Valve Bonnet | Ductile Iron ASTM A536  |
| Disc Guide        | Stainless Steel         |
| Seat              | Stainless Steel         |
| Disc              | Buna-N Rubber           |
| Diaphragm         | Nylon Reinforced Buna-N |
| Stem              | Stainless Steel         |
| Spring            | Stainless Steel         |

\*The closing speed control (optional) on this valve should always be open at least three (3) turns off its seat.

### Schematic Diagram

| Item | Description of Standard Features |
|------|----------------------------------|
| 1    | Main Valve                       |
| 2    | 850XL Isolation Valve            |
| 3    | SXL "Wye" Type Strainer          |
| 4    | Pressure Gauge                   |
| 5    | Restriction Fitting              |
| 6    | PRXL Pressure Reducing Control   |



| BODY CONFIGURATIONS |                              | GLOBE STYLE BODY |              | ANGLE STYLE BODY |
|---------------------|------------------------------|------------------|--------------|------------------|
| END CONNECTION      | PRESSURE RATING              | FULL PORT        | REDUCED PORT |                  |
| Threaded            | 400 psi max.                 | 1 1/4"-3"        | n/a          | 1 1/4"-3"        |
| Flanged             | ANSI Class 150, 250 psi max. | 1 1/2"-16"       | 3"-10"       | 1 1/2"-10"       |
|                     | ANSI Class 300, 400 psi max. |                  |              |                  |
| Grooved             | 300 psi max.                 | 1 1/2"-10"       | n/a          | 1 1/2"-10"       |

MINIMUM INLET PRESSURE 10 PSI

TEMPERATURE RATING:  Water 33°F to 140°F  
 PILOT SPRING RANGE:  15-150 psi

### Standard Features

- Epoxy Coated, FDA Approved
- Pilot Assembly
  - "Wye" Type Strainer
  - Opening Speed Control (sizes 1 1/4" - 4")
  - Isolation Valves
- Inlet and Outlet Pressure Gauges
- ANSI Class 150 Flanges
- Copper Tubing and Brass Fittings

### Options (Add suffix letters to ZW209)

#### Function

- C - 40XL2 Hydraulic Check with Isolation Valve
- L - SC1 Closing Speed Control\*
- O - SC1 Opening Speed Control (Standard 1 1/4" - 4")

#### Body

- A - Angle Style Body
- R - Reduced Port Body

#### Connections

- G - IPS Grooved
- TH - NPT Threaded
- Y - ANSI Class 300 Flanges

#### Main Valve Options

- V - Viton Rubber Internals, rated 180°F (1-1/4"-6", only available with "LP" or "HP" Option)
- Z - ZPI Visual Position Indicator

#### Pilot System

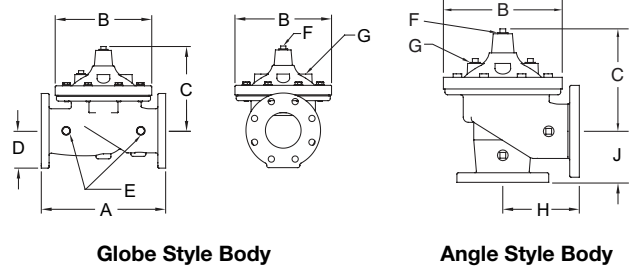
- LP - 5-25 psi Low Pressure Range PV-PRD Pilot (replaces PRXL)
- HP - 30-300 psi High Pressure Range PV-PRD Pilot (replaces PRXL)
- SP - All Stainless Steel Pilotry (replaces all brass fittings, pilot valve and copper tubing. "GL" Option included)
- SH - Stainless Steel Braided Hoses (only replaces Copper Tubing)
- RV - Pilot on Reverse Side
- GL - Liquid Filled Gauge

### Globe and Angle Main Valve Dimensions

| DIM                        | FULL PORT         | VALVE SIZE INCHES (mm) |           |        |            |        |          |         |          |          |          |          |          |
|----------------------------|-------------------|------------------------|-----------|--------|------------|--------|----------|---------|----------|----------|----------|----------|----------|
|                            |                   | 1 1/4 (32)             | 1 1/2(38) | 2 (50) | 2 1/2 (65) | 3 (80) | 4 (100)  | 6 (150) | 8 (200)  | 10 (250) | 12 (300) | 14 (350) | 16 (400) |
| A                          | Threaded          | 7 1/4                  | 7 1/4     | 9 7/16 | 11         | 12 1/2 |          |         |          |          |          |          |          |
|                            | Class 150 Flange  |                        | 8 1/2     | 9 3/8  | 11         | 12     | 15       | 20      | 25 3/8   | 29 3/4   | 34       | 39       | 41 3/8   |
|                            | Class 300 Flange  |                        | 9         | 10     | 11 5/8     | 13 1/4 | 15 5/8   | 21      | 26 7/16  | 31 1/8   | 35 1/2   | 40 1/2   | 43 1/2   |
|                            | Grooved           |                        | 8 1/2     | 9      | 11         | 12 1/2 | 15       | 20      | 25 3/8   | 29 3/4   |          |          |          |
| B                          | Diameter          | 5 5/8                  | 5 5/8     | 6 3/4  | 8          | 9 3/16 | 11 11/16 | 15 3/4  | 20 1/8   | 23 11/16 | 27 1/2   | 31 3/4   | 34 1/2   |
| C                          | Max.              | 5 3/4                  | 5 3/4     | 6 3/16 | 7 3/8      | 8      | 10 3/16  | 12 5/16 | 15 9/16  | 17 5/8   | 20 3/16  | 22 13/16 | 25 7/8   |
| D                          | Threaded/Grooved  | 1 3/8                  | 1 3/8     | 1 3/4  | 2 1/8      | 2 9/16 | 3 7/16   | 5       | 5        | 5 13/16  | 6 3/4    | 8 7/8    | 8 13/16  |
|                            | Class 150 Flange  |                        | 2 1/2     | 3      | 3 1/2      | 3 3/4  | 4 1/2    | 5 1/2   | 6 3/4    | 8        | 9 1/2    | 10 1/2   | 11 3/4   |
|                            | Class 300 Flange  |                        | 3         | 3 1/4  | 3 3/4      | 4 1/8  | 5        | 6 1/4   | 7 1/2    | 8 3/4    | 10 1/4   | 11 1/2   | 12 3/4   |
| E                          | NPT Body Tap      | 3/8                    | 3/8       | 3/8    | 1/2        | 1/2    | 3/4      | 3/4     | 1        | 1        | 1        | 1        | 1        |
| F                          | NPT Cvr. Plug Tap | 1/2                    | 1/2       | 1/2    | 1/2        | 1/2    | 3/4      | 3/4     | 1        | 1        | 1        | 1        | 1        |
| G                          | NPT Cover Tap     | 3/8                    | 3/8       | 3/8    | 1/2        | 1/2    | 3/4      | 3/4     | 1        | 1        | 1        | 1        | 1        |
| H                          | Threaded          | 3 1/4                  | 3 1/4     | 4 3/4  | 5 1/2      | 6 1/4  |          |         |          |          |          |          |          |
|                            | Class 150 Flange  |                        | 4         | 4 3/4  | 5 1/2      | 6      | 7 1/2    | 10      | 12 11/16 | 14 7/8   |          |          |          |
|                            | Class 300 Flange  |                        | 4 1/4     | 5      | 6          | 6 7/16 | 8        | 10 1/2  | 13 1/4   | 15 9/16  |          |          |          |
|                            | Grooved           |                        | 4 7/16    | 4 3/4  | 5 1/2      | 6      | 7 1/2    | 10      | 12 11/16 | 14 7/8   |          |          |          |
| J                          | Threaded          | 1 15/16                | 1 15/16   | 3 1/4  | 4          | 4 1/2  |          |         |          |          |          |          |          |
|                            | Class 150 Flange  |                        | 4         | 3 1/4  | 4          | 4      | 5        | 6       | 8        | 8 5/8    |          |          |          |
|                            | Class 300 Flange  |                        | 4 1/4     | 3 1/2  | 4 5/16     | 4 7/16 | 5 5/16   | 6 1/2   | 8 1/2    | 9 5/16   |          |          |          |
|                            | Grooved           |                        | 3 3/16    | 3 1/4  | 4          | 4 1/4  | 5        | 6       | 8        | 8 5/8    |          |          |          |
| Valve Stem Internal Thread |                   | 10-32                  | 10-32     | 10-32  | 10-32      | 1/4-20 | 1/4-20   | 1/4-20  | 3/8-16   | 3/8-16   | 3/8-16   | 3/8-16   | 3/8-16   |
| Stem Travel (in)           |                   | 7/16                   | 7/16      | 3/4    | 7/8        | 1      | 1 3/16   | 1 3/4   | 2 3/8    | 2 13/16  | 3 7/16   | 3 13/16  | 4 5/16   |
| Approx. Wt. (lbs)          |                   | 22                     | 26        | 36     | 55         | 70     | 130      | 240     | 440      | 720      | 820      | 1200     | 1550     |

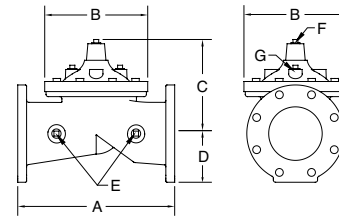
### Reduced Port Main Valve Dimensions

| DIM                        |                   | VALVE SIZE INCHES (mm) |          |          |          |           |
|----------------------------|-------------------|------------------------|----------|----------|----------|-----------|
|                            |                   | 3" (80)                | 4" (100) | 6" (150) | 8" (200) | 10" (250) |
| A                          | Class 150 Flange  | 10 1/4                 | 14       | 17 3/4   | 21 7/16  | 26        |
|                            | Class 300 Flange  | 11                     | 14 1/2   | 18 11/16 | 22 7/16  | 27 7/16   |
| B                          | Dia               | 6 3/4                  | 9 3/16   | 11 11/16 | 15 3/4   | 20 1/8    |
| C                          | Max               | 6 3/8                  | 8 7/16   | 12 5/16  | 13 1/4   | 16 3/4    |
| D                          | Class 150 Flange  | 3 3/4                  | 4 1/2    | 5 1/2    | 6 3/4    | 8         |
|                            | Class 300 Flange  | 4 1/8                  | 5        | 6 1/4    | 7 1/2    | 8 3/4     |
| E                          | NPT Body Tap      | 3/8                    | 1/2      | 3/4      | 3/4      | 1         |
| F                          | NPT Cvr. Plug Tap | 3/8                    | 1/2      | 3/4      | 3/4      | 1         |
| G                          | NPT Cvr. Tap      | 3/8                    | 1/2      | 3/4      | 3/4      | 1         |
| Valve Stem Internal Thread |                   | 10-32                  | 1/4-20   | 1/4-20   | 3/8-16   | 3/8-16    |
| Stem Travel (in)           |                   | 3/4                    | 1        | 1 1/5    | 1 3/4    | 2 3/8     |
| Approx. Wt. (Lbs)          |                   | 35                     | 80       | 140      | 275      | 480       |



Globe Style Body

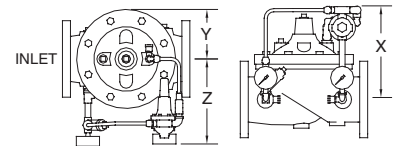
Angle Style Body



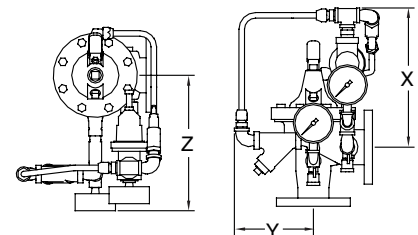
Reduced Port Body

### Pilot System Dimensions

| PILOT SYSTEM DIMENSIONS |   | VALVE SIZE INCHES (mm) |            |         |             |         |          |          |          |           |           |           |           |
|-------------------------|---|------------------------|------------|---------|-------------|---------|----------|----------|----------|-----------|-----------|-----------|-----------|
| DIM                     |   | 1-1/4 (32)             | 1-1/2 (40) | 2" (50) | 2-1/2" (65) | 3" (80) | 4" (100) | 6" (150) | 8" (200) | 10" (250) | 12" (300) | 14" (350) | 16" (400) |
| Full Port Body          | X | 8 1/2                  | 8 1/2      | 8 1/2   | 8 1/2       | 9 1/2   | 12       | 13       | 14       | 17 1/2    | 20        | 23        | 26        |
|                         | Y | 4                      | 4          | 3 1/2   | 4           | 4 1/2   | 6        | 8        | 10       | 12        | 14        | 16        | 17 1/2    |
|                         | Z | 8 1/2                  | 8 1/2      | 9       | 9           | 9 1/2   | 10       | 11 1/2   | 13       | 14 1/2    | 17        | 19        | 20 1/2    |
| Reduced Port Body       | X |                        |            |         |             | 8 1/2   | 9 1/2    | 12       | 13       | 14        |           |           |           |
|                         | Y |                        |            |         |             | 3 1/2   | 4 1/2    | 6        | 8        | 10        |           |           |           |
|                         | Z |                        |            |         |             | 9       | 9 1/2    | 10       | 11 1/2   | 13        |           |           |           |
| Angle Body              | X | 9                      | 9          | 9       | 9           | 10      | 12 1/2   | 13 1/2   | 14 1/2   | 18        |           |           |           |
|                         | Y | 5                      | 5          | 5       | 5           | 5       | 6        | 8        | 10       | 12        |           |           |           |
|                         | Z | 9                      | 9          | 9 1/2   | 9 1/2       | 10      | 10 1/2   | 12       | 13 1/2   | 15        |           |           |           |



Globe Pilot System Dimensions



Angle Pilot System Dimensions

## Flow Characteristics

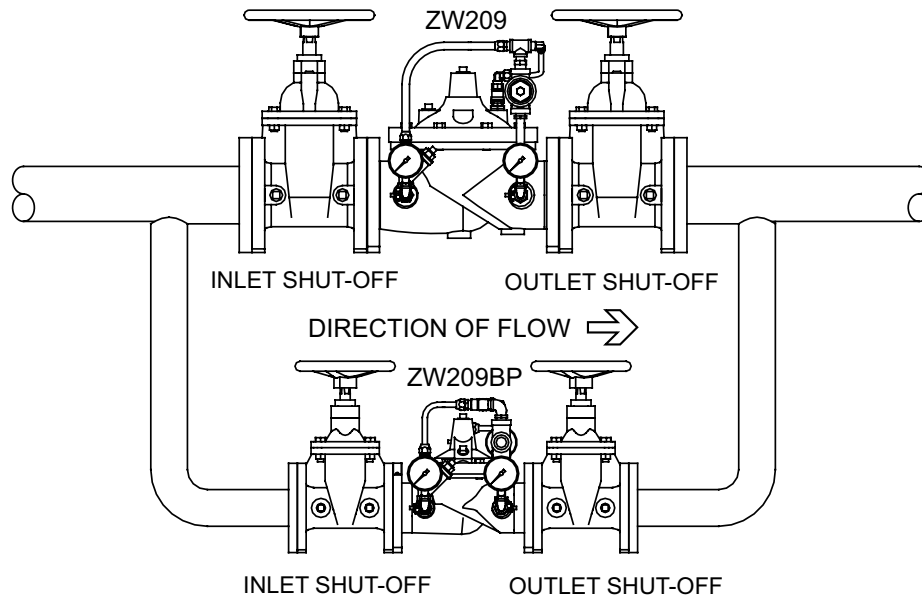
| Full Port Globe and Angle Valve size | inches (mm)       | 1 1/4 (32) | 1 1/2 (40) | 2 (50) | 2 1/2 (65) | 3 (80) | 4 (100) | 6 (150) | 8 (200) | 10 (250) | 12 (300) | 14 (350) | 16 (400) |
|--------------------------------------|-------------------|------------|------------|--------|------------|--------|---------|---------|---------|----------|----------|----------|----------|
| Reduced Port Globe Valve Size        | inches (mm)       |            |            | 3 (80) |            |        | 4 (100) | 6 (150) | 8 (200) | 10 (250) |          |          |          |
| Suggested Flow (GPM)                 | Max. Continuous   | 93         | 125        | 210    | 300        | 460    | 800     | 1800    | 3100    | 4900     | 7000     | 8400     | 11000    |
|                                      | Max Intermittent  | 120        | 160        | 260    | 375        | 600    | 1000    | 2250    | 4000    | 6150     | 8700     | 10500    | 13800    |
|                                      | Min. Continuous   | 10         | 10         | 15     | 20         | 30     | 50      | 115     | 200     | 300      | 435      | 530      | 690      |
| Suggested Flow (Liters/sec)          | Max. Continuous   | 6          | 8          | 13     | 19         | 29     | 50      | 113     | 195     | 309      | 550      | 665      | 870      |
|                                      | Max. Intermittent | 7.6        | 10         | 16.4   | 23         | 37     | 62      | 142     | 246     | 388      | 440      | 530      | 95       |
|                                      | Min. Continuous   | .6         | .6         | 0.9    | 1.3        | 1.9    | 3.2     | 7.2     | 13      | 19       | 28       | 33       | 43       |

Suggested flow calculations are based on flow through Schedule 40 Pipe. Maximum continuous flow is approx. 20 ft./sec (6.1 meters/sec) & maximum intermittent is approx. 25 ft./sec (7.6 meters/sec) and minimum continuous flow is approx. 1.25 ft./sec (0.4 meters/sec). Many factors should be considered in sizing pressure reducing valves including inlet pressure, outlet pressure and flow rates.

## Operation

The Model ZW209 utilizes a pressure reducing pilot valve that installs on the discharge side of the control circuitry. The pilot is a direct acting, normally open, spring loaded, diaphragm actuated valve. The operation of the ZW209 begins with accurately sizing the valve, then fine tuning the control circuit by adjusting the pilot spring to the desired downstream pressure. Inlet pressure is piped to the inlet port of the pressure reducing pilot. A sensing line runs internally from the discharge side of the pilot to its lower control chamber under the diaphragm. Thus, downstream pressure exceeding the preset acts to close the pilot while the adjustable spring seeks to keep it open. The result is a modulating action in the pilot that is transmitted to the bonnet of the main valve. This creates a mirror modulation of the diaphragm assembly in the main valve. Downstream pressure is maintained within narrow limits regardless of changing flow rates or varying inlet pressures.

## Typical Installation



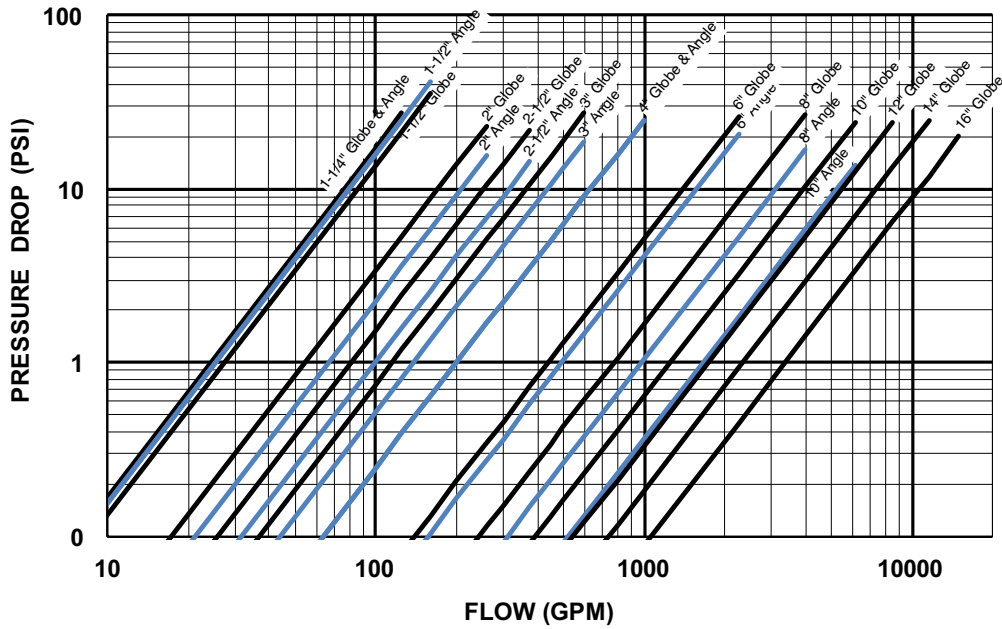
## Notice:

In cases where design flow falls below the minimum continuous flow rate, a low flow by-pass shall be installed.

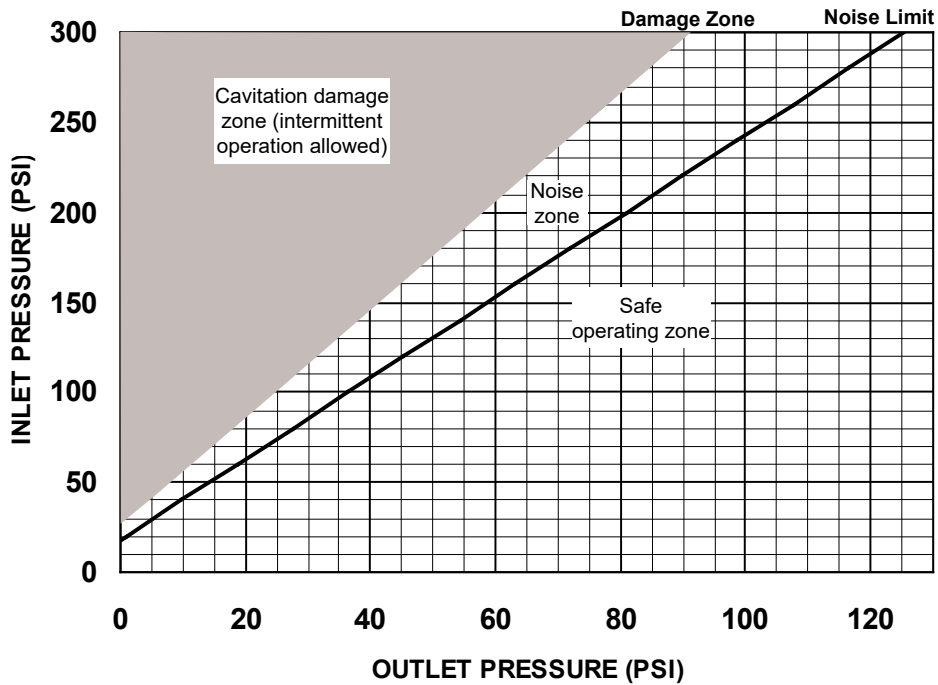
## Specifications

The Pressure Reducing Valve shall be a diaphragm actuated, pilot controlled valve. The main valve body shall be ductile iron ASTM A 536. The stem of the basic valve shall be guided top and bottom. The diaphragm shall not be used as a seating surface. All internal and external ferrous surfaces shall be coated with a high quality, fusion epoxy coating. The pilot control shall be field adjustable from 15 psi to 150 psi. The valve shall be certified to NSF/ANSI Standard 61. The Pressure Reducing Valve shall be a ZURN WILKINS Model ZW209.

### BODY MINIMUM FRICTION LOSS



### PRESSURE REDUCTION LIMIT



**\* Notes for Body Minimum Friction Loss Chart:**

Minimum inlet pressure is 10 psi higher than set point or the additional body friction loss at intended flow, whichever is higher. (friction loss may be important at flows above 20 ft/s)

Example: A 6" valve intended to flow 2000 GPM at 150 psi has a friction loss of 20 psi at 2000 GPM. The minimum inlet pressure would be 150 + 20 = 170 psi. When inlet pressure is below set point, the outlet pressure will be the pressure at the inlet minus the friction loss.

Job Name \_\_\_\_\_ Contractor \_\_\_\_\_

Job Location \_\_\_\_\_ Engineer \_\_\_\_\_