CLA-VAL™

Factory Set Pressure Reducing Valves
Installation and Operating Instructions

1. MODELS AND SIZES

The Cla-Val's 90-FS-PRV is a non-adjustable factory set pressure reducing valve available in 1.5" and 2.5" sizes. System designers have the option to choose from a range of five (5) different piston diameters in the 1.5" size and eight (8) different piston diameters in the 2.5" size, allowing them to satisfy all required inlet/outlet pressure ratios.

Size	Valve Model	Configuration	Inlet	Outlet
1.5"	90-FS-PRV-150-FF	Angle Body (90-Degree)	Female NPT	Female NPT
	90-FS-PRV-150-FM	Angle Body (90-Degree)	Female NPT	Male NPT *or* Male Hose Thread
	90-FS-PRV-150-GG*	Angle Body (90-Degree)	Grooved Pipe	Grooved Pipe
2.5"	90-FS-PRV-FF	Angle Body (90-Degree)	Female NPT	Female NPT
	90-FS-PRV-FM	Angle Body (90-Degree)	Female NPT	Male Hose Thread
	90-FS-PRV-SG*	Inline Body	Grooved Pipe	Grooved Pipe
	90-FS-PRV-ST	Inline Body	Female NPT	Female NPT

*The grooved version of the 90-FS-PRV is limited for use within a sprinkler system and is not intended for connection to a fire hose.

2. APPLICATION GUIDELINES

A) Automatic Sprinkler Systems

The 90-FS-PRV is listed by Underwriters Laboratories as a Special System Water Control Valve – Pressure Reducing and Pressure Control Type (VLMT), and also meets the listing requirements for indicating valves. Installation requirements of these pressure reducing valves in automatic sprinkler systems are defined in the Standard for Installation of Sprinkler Systems, NFPA 13. The 2.5" valve is listed for use in Class I and Class III systems; the 1.5" valve is listed for use in Class II systems. In addition, the 90-FS-PRV is also listed as a checking device, eliminating the need for a separate check valve.

These valves are typically used in automatic sprinkler systems where supply riser pressures exceed 175psi. When designing sprinkler systems that include this valve, please observe the following limitations:

Valve Model	Bonnet Type	Max. Flow [GPM]	Max. Pressure [psig]
90-FS-PRV FF, FM, and GG 1.5"	Type 1	250	210
	Type 2	250	250
	Type 3	250	260
	Type 4A	250	260
	Type 4B	200	275
	Type 5	250	300
90-FS-PRV FF, FM, SG, ST 2.5"	Type 0	500	210
	Type 1	500	220
	Type 2	500	230
	Type 3	500	265
	Type 4	500	300
	Type 5	500	320
	Type 6	500	360
	Type 7	500	400

B) Automatic Sprinkler Systems Installation Requirements

1. To permit easy replacement or repair of the 90-FS-PRV, pipe unions or rubber gasketed couplings are to be installed immediately upstream or downstream of the valve.
2. A relief valve of not less than 1/2" NPS is to be installed on the downstream side of the pressure reducing valve; and
3. Pressure gauges are to be installed on the inlet and outlet sides of each pressure reducing valve.
4. Valve Type (Type 1-5 for 1.5" valves or Type 0-7 for 2.5" valves) should be selected to provide an outlet pressure not exceeding 165 psig at the maximum inlet pressure.
5. A line-sized Tee connection is advised to be installed downstream of valves to allow full flow testing as required every 5 years by NFPA 25
6. The minimum residual pressure shall not be less than 50 psig.
7. Upon system completion, each valve must be tested under both flow and no-flow conditions to verify that static and residual outlet pressures and flow rates satisfy system design requirements as per NFPA 13.

C) Standpipe Systems

The 90-FS-PRV is suitable for use as a pressure reducing hose valve in a standpipe systems. Cla-Val's 90-FS-PRV valves are listed by Underwriters Laboratories as Standpipe Equipment Pressure Reducing Devices (VUTX); the 2.5" valve can be used for Class I and Class III systems while the 1.5" can be used for Class II systems.

D) Standpipe Installation Requirements

1. NFPA 14 requires that hose valve outlet pressure for Class I and Class III service be no greater than 175 psi and no less than 100 psi. When permitted by the authority having jurisdiction, pressures less than 100 psi may be allowed; discharge pressure shall not be less than 65 psig.
2. Class II hose valve must be limited to a maximum residual outlet pressure of 100 psi; discharge pressure shall not be less than 65 psig.
3. Upon completion of the system, each Cla-Val's 90-FS-PRV valve shall be tested in accordance with the Standard for the Installation of Standpipe and Hose Systems, NFPA 14, to verify that the installation is correct, that the valves are operating properly, and that the inlet and outlet pressures at the valve are in accordance with the system design.

E) Supervisory Switch

Housing assemblies are available for the attachment of a push-button supervisory switch to the 90-FS-PRV in both the 1.5" and 2.5" size. A listed normally open (NKK SB4011NOM) or normally closed (NKK SB4011NCM) switch may be specified.

F) General System Installation Instructions

1. Flush system thoroughly to remove rust, scale, or any other foreign debris that could damage the internal components of the valve.
2. Install the valve with the flow direction arrow oriented in the direction of flow; tighten valve to system using the hex surface provided. Alternate means of installation could result in serious damage to valve.
3. Bleed all trapped air from system to ensure accurate reading at the outlet. Trapped air may cause outlet pressure fluctuations at low flow conditions.
4. Valves are to be tested after installation in accordance with NFPA 13 or NFPA 14, or both NFPA 13 and 14, whichever is applicable.
5. Maintenance, inspection, and testing should be performed periodically after installation in accordance with NFPA 25, the Standard for the Inspection and Testing and Maintenance of Water-Based Fire Protection System

3. VALVE CARE AND MAINTENANCE

The 90-FS-PRV series valve is classified as an Automatic Valve, and should not require repair during normal operating conditions. It is imperative for the system to be free of any debris to insure a long life of the valve. After installation and testing of the valve, be sure to fill the system slowly to prevent water hammer. Annual flow tests are recommended to allow the valve to reset itself, and clear any debris from the system. If repair is necessary, the system should be drained, and access can be gained to the internal components by disassembling the bonnet from the body. Contact the factory for additional support and replacement components.

4. VALVE TYPE SELECTION

In order to accurately select the correct valve type, complete water supply data will be required, including the residual pressure at each valve location. To select the correct valve for each location, use the following steps:

1. Determine the residual pressure at the valve inlet.
2. Determine the demand required at the outlet of the valve in gallons per minute.
3. Use the residual pressure chart with the desired body size, style, and flow range; locate the inlet residual pressure on the vertical axis of the chart and draw a horizontal line across the chart.
4. Locate the desired residual valve outlet pressure on the horizontal axis of the chart and draw a vertical line.
5. The flow curve closest to the intersection of the two lines will be the appropriate valve.
6. Using the static inlet pressure from the water supply data, locate this value on the vertical axis of the static pressure chart. Draw a horizontal line across to the flow curve, and from the flow curve vertically down to the horizontal axis. The static outlet pressure is at the intersection of the vertical line and the horizontal axis*.
7. Ensure valves that have been intended for use in a Sprinkler applications are compliant with the guidelines set by UL and NFPA 13
8. Ensure valves that have been intended for use in a Standpipe applications are compliant with the guidelines set by UL and NFPA 14

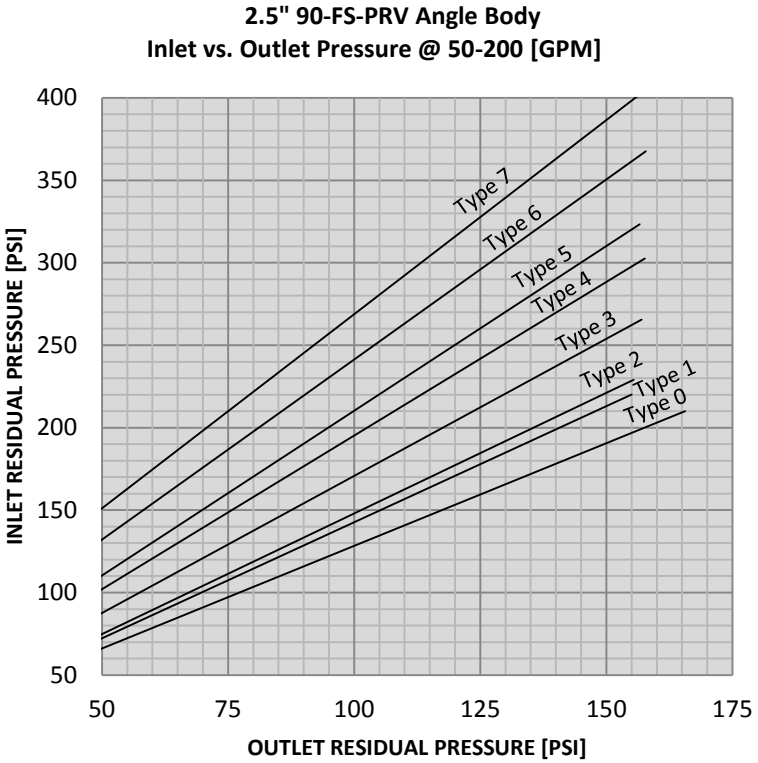
*Note: If the static outlet pressure exceeds the maximum outlet pressure as specified by NFPA 13 or NFPA 14, the next valve to the left of the selected valve shall be used and verified with the process above.

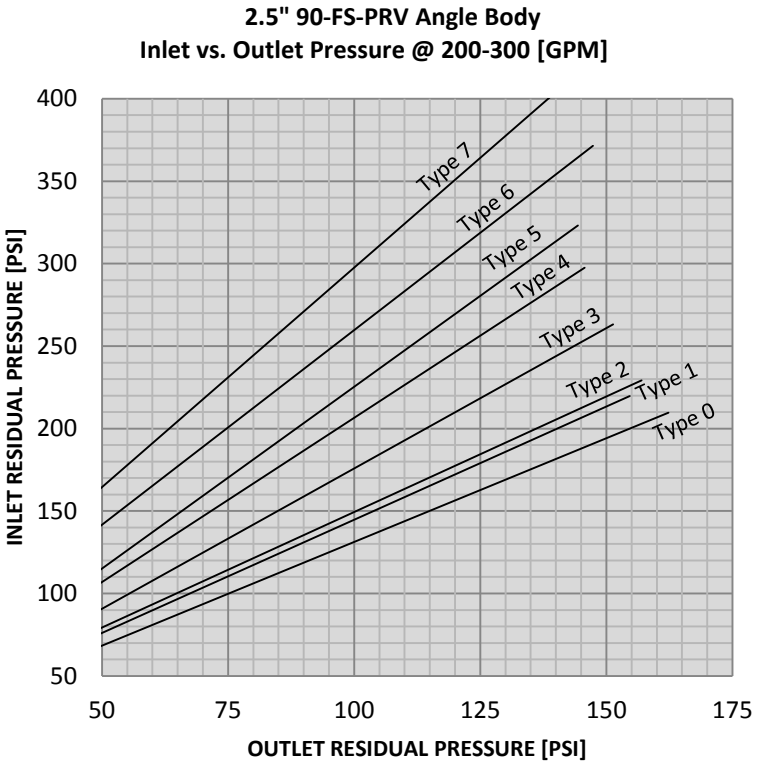
Alternatively, a Valve Selection Guide is available for download on our website to recommend the correct valve type to be selected based upon the water supply data provided at www.cla-val.com

Proper performance is dependent upon licensed, qualified personnel performing regular, periodic testing according to Cla-Val's specifications and instructions, as well as prevailing governmental and industrial standards and codes. Failure to do so will release Cla-Val of any liability that it might have otherwise had with respect to that device. Such failure could also result in an improperly function device.

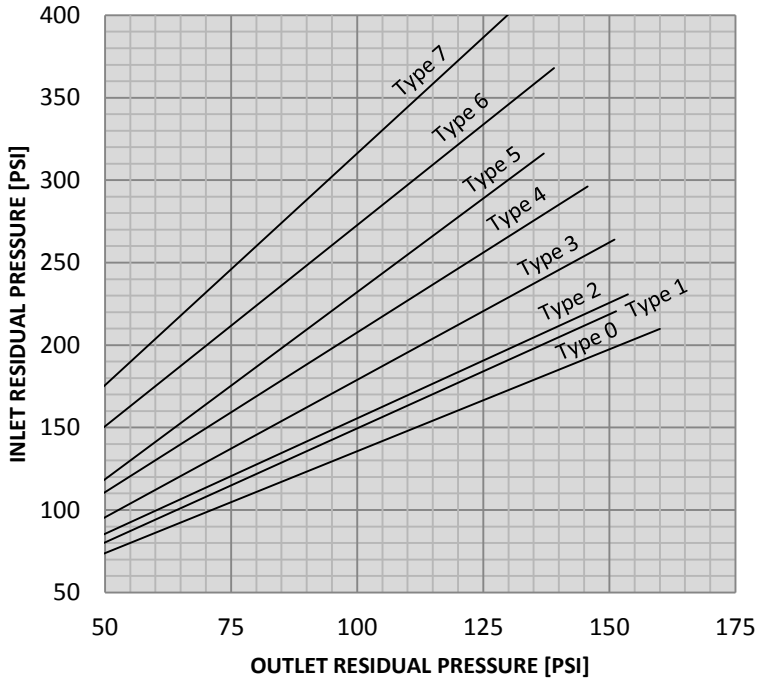
5. FLOW CHARTS

A) 2.5" 90-FS-PRV Angle (90-Degree) Body

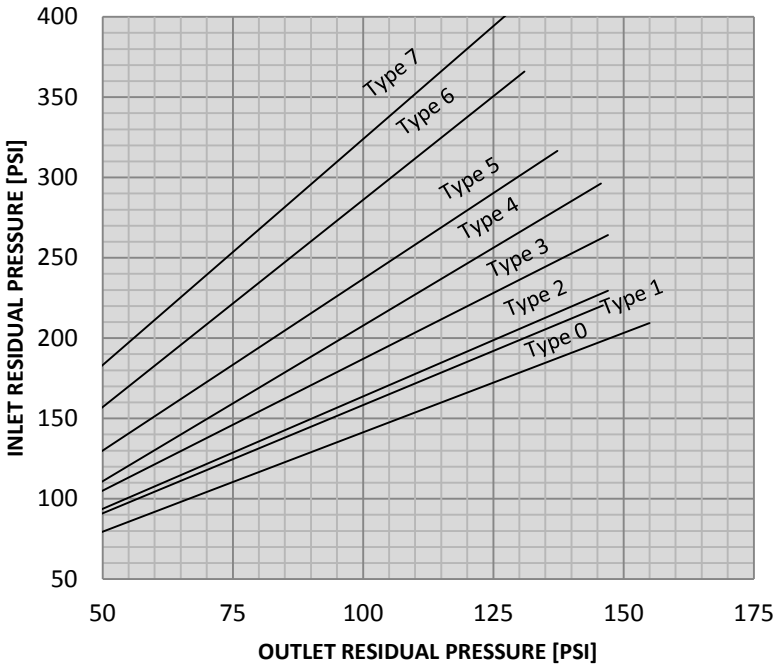


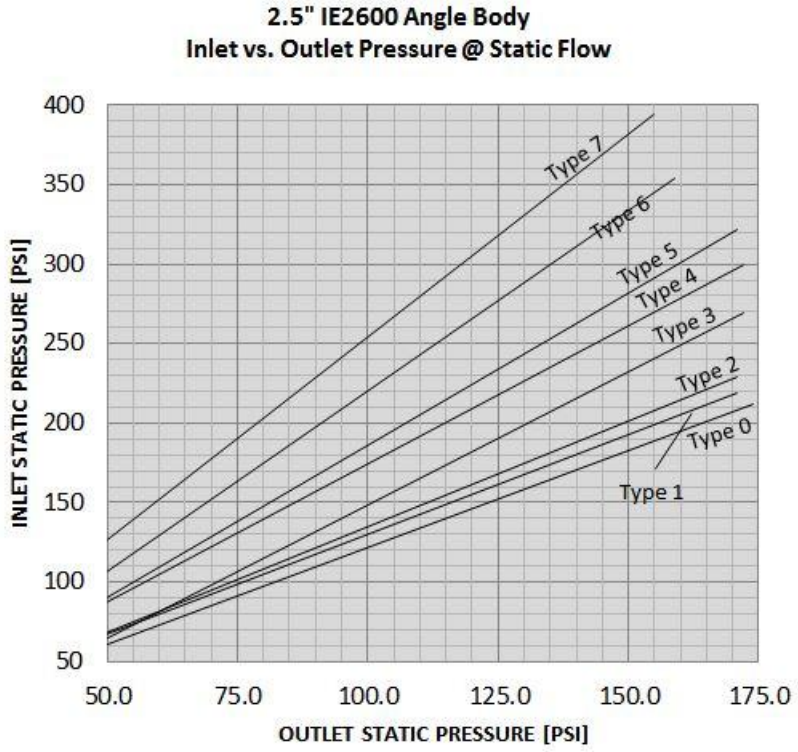


2.5" 90-FS-PRV Angle Body
Inlet vs. Outlet Pressure @ 300-400 [GPM]

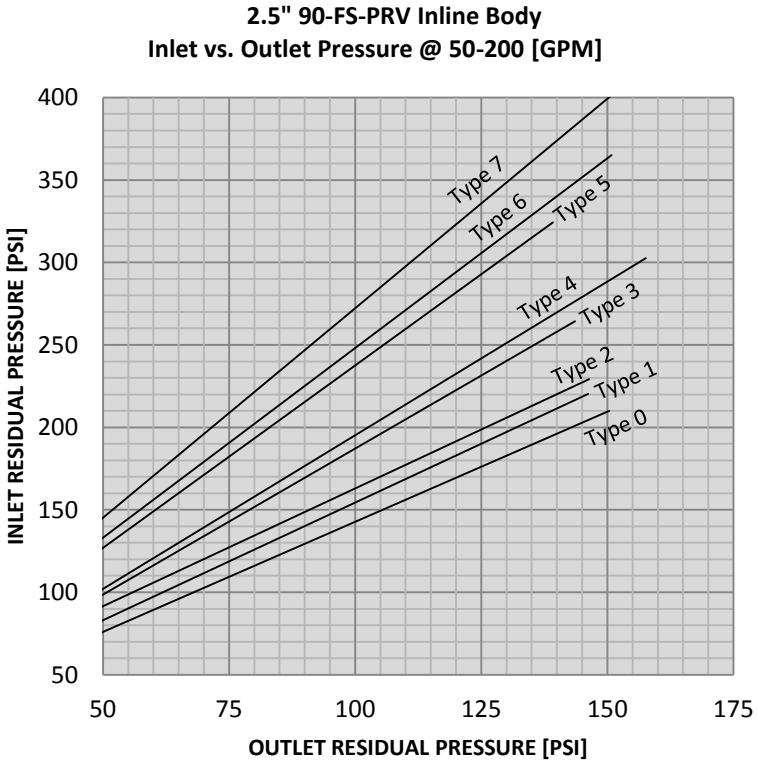


2.5" 90-FS-PRV Angle Body
Inlet vs. Outlet Pressure @ 400-500 [GPM]

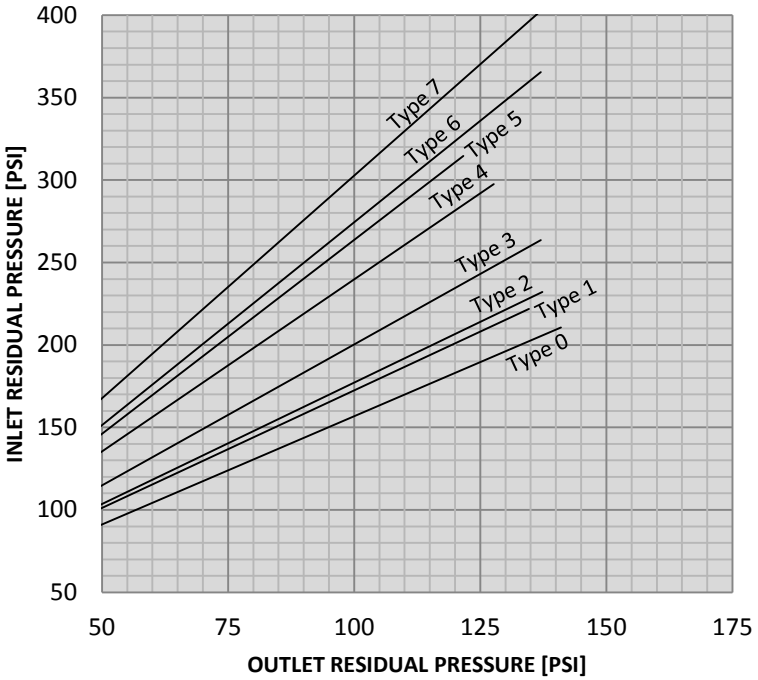




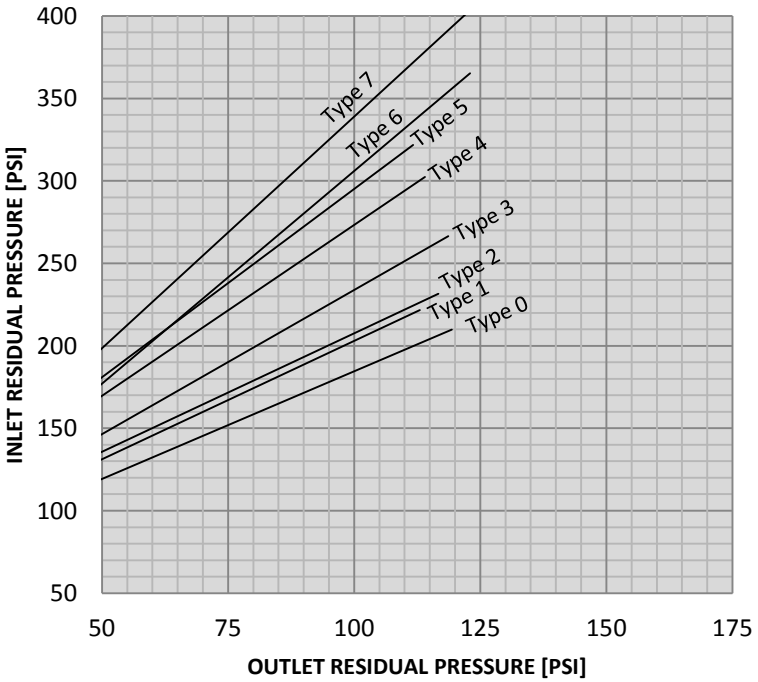
B) 2.5" 90-FS-PRV Inline (Straight) Body



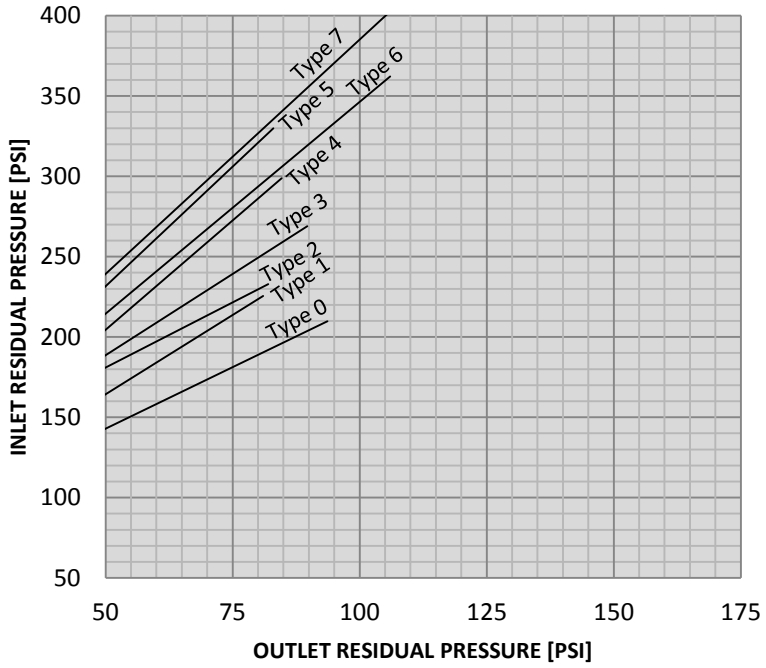
2.5" 90-FS-PRV Inline Body
Inlet vs. Outlet Pressure @ 200-300 [GPM]



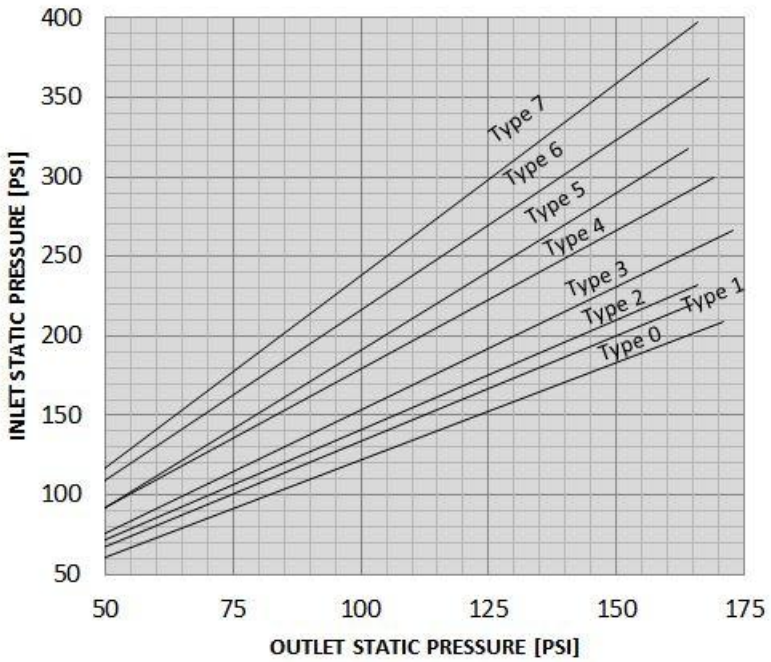
2.5" 90-FS-PRV Inline Body
Inlet vs. Outlet Pressure @ 300-400 [GPM]



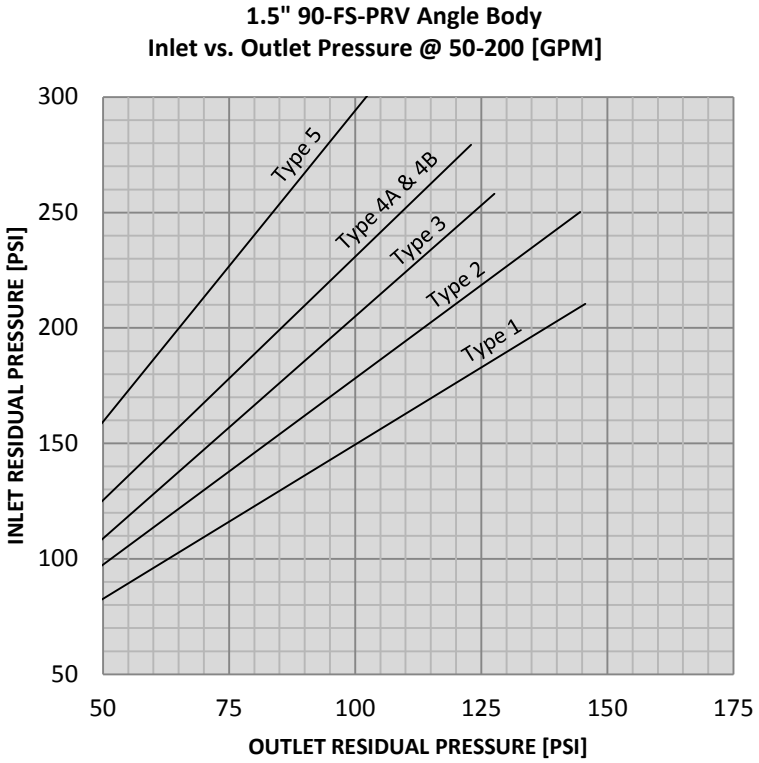
2.5" 90-FS-PRV Inline Body
Inlet vs. Outlet Pressure @ 400-500 [GPM]

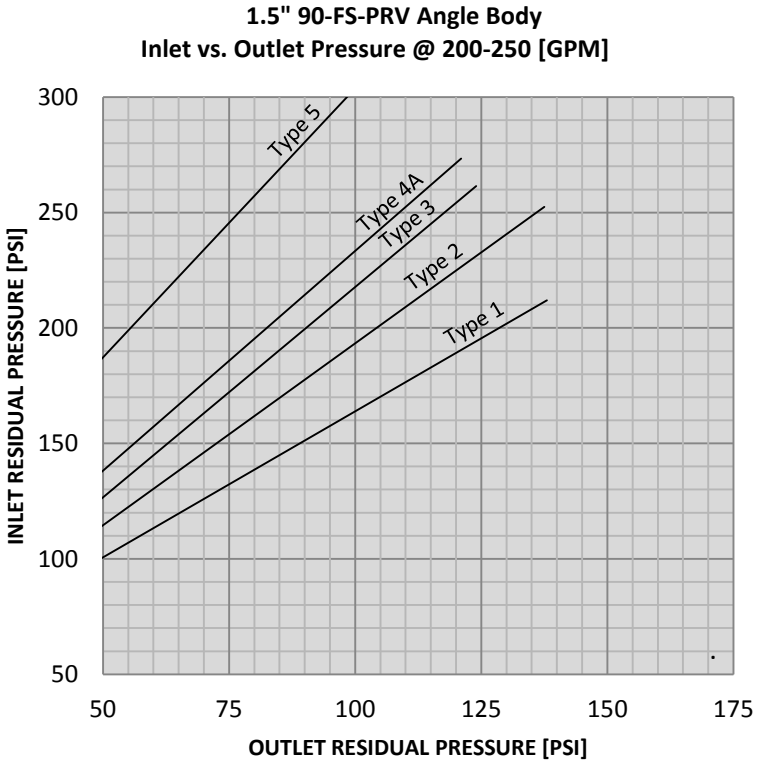


2.5" IE2600 Inline Body
Inlet vs. Outlet Pressure @ Static Flow



C) 1.5" 90-FS-PRV Angle (90-Degree) Body





1.5" 90-FS-PRV Angle Body
Inlet vs. Outlet Pressure @ Static Flow