PRESSURE-MATIC®
AUTOMATIC PRESSURE REDUCING VALVES

Installation, Operating, & Maintenance Instructions

98656000 Rev B

+1 574-295-8330
www.elkhartbrass.com

ELKHART BRASS
A Safe Fleet Brand

Contents

I. Models and Sizes Covered:

UR-30, 1-1/2" size, bonnet types XN, YZN, ZN, ZAN, ZBN, ZZN, & ZZA

UR-35, 1-1/2" size, bonnet types XN, YZN, ZN, ZAN, ZBN, ZZN, & ZZA

UR-30, 2-1/2" size, bonnet types DEN, EN, EFN, FN, DN, CDN, & CN

UR-35, 2-1/2" size, bonnet types DEN, EN, EFN, FN, DN, CDN, & CN

UR-30S, 2-1/2" size, bonnet types DEN, EN, EFN, FN, DN, CDN, & CN

Inlet and Outlet Connections:

Valve Model & Size	*Inlet Thread	*Outlet Thread
UR-30, 1-1/2"	1-1/2" fem. NPT	1-1/2" fem. NPT
UR-35, 1-1/2"	1-1/2" fem. NPT	1-1/2" male NH
UR-30, 2-1/2"	2-1/2" fem. NPT	2-1/2" fem. NPT
UR-35, 2-1/2"	2-1/2" fem. NPT	2-1/2" male NH
UR-30S, 2-1/2"	2-1/2" fem. NPT	2-1/2" fem. NPT

*NPT = American National Standard Taper Pipe Threads (ANSI/ASME B1.20.1-2013, R2018)

NH = American National Fire Hose Connection Screw Thread (NFPA 1963-2014 Ed.)

II. Application Guidelines:

These UL Listed pressure reducing valves are intended for use in standpipe systems or in the supply piping for automatic sprinkler systems.

A. Automatic Sprinkler Systems

Pressure-Matic® valves are most commonly used in automatic sprinkler systems as floor control valves in high- rise buildings where supply riser pressures exceed 175 psi.. Requirements for the installation of pressure reducing valves in automatic sprinkler systems are given in Section 16 of NFPA 13, Standard for the Installation of Sprinkler Systems, Latest Edition.
When designing Pressure-Matic valves into a sprinkler system, the following maximum flow rate limits should be observed:

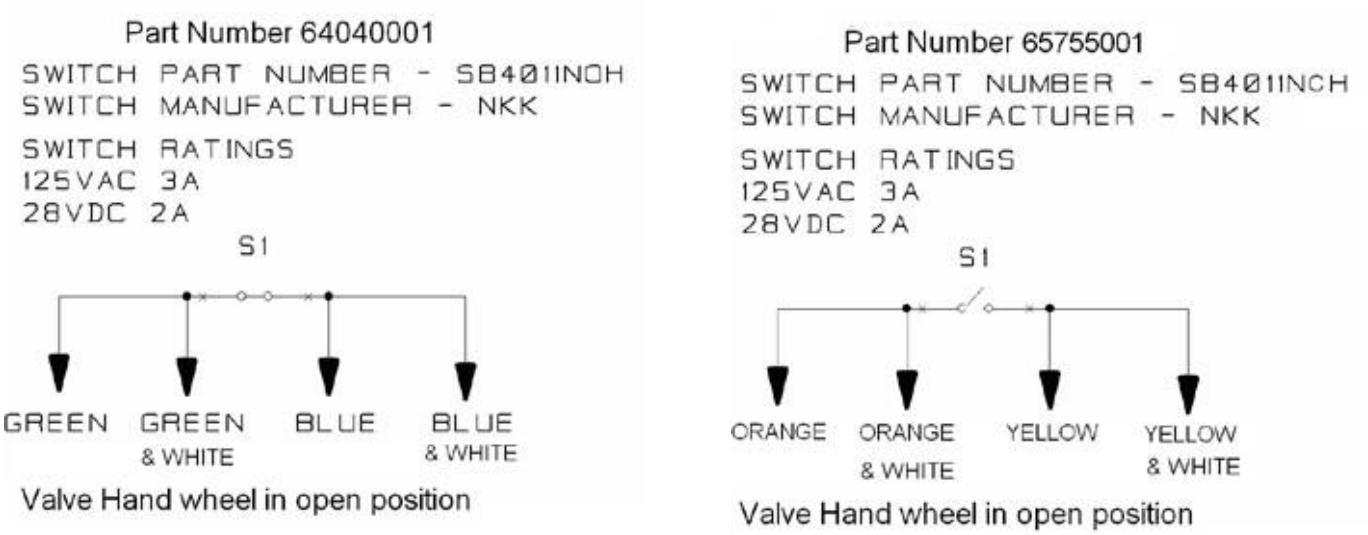
Valve Model	Bonnet Type	Max. Flow (gpm)	Max. Pressure (PSI)
UR-30 & UR-35 2-1/2"	DEN	500	300
	EN	500	260
	EFN	500	240
	FN	500	220
	DN	500	360
	CDN	500	395
	CN	500	400
UR-30S 2-1/2"	DEN	500	300
	EN	500	260
	EFN	500	240
	FN	500	220
	DN	500	360
	CDN	500	395
	CN	500	400
UR-30 & UR-35 1-1/2"	XN	200	300
	YZN	200	300
	ZAN	200	280
	ZN	200	300
	ZBN	200	250
	ZZN	200	220
	ZZAN	200	190

These valves are also listed as a checking device, which eliminates the need for a separate check valve. When sprinklers on a given floor are fed from dual risers, the Pressure-Matic valve acts as a check valve to prevent loss of sprinkler water supply in the event of damage to one riser.

Supervisory Switch

Pressure reducing/ controlling valves that are to be used as part of a sprinkler system should include a supervisory switch to signal when a valve is not manually in the fully opened position (refer to NFPA 13 for more details on supervisory requirements). An optional supervisory switch assembly with UL approval for use with UR valves is available on all models. The supervisory switch may be mounted in one of the 4 locations provided in the upper bonnet in the ½ inch tapped holes provided. A cap plug is secured in the upper bonnet tapped holes when the supervisory switch is not installed. A UL Listed conduit elbow is utilized as a water-resistant enclosure for the electronic switch. The conduit elbow provides an opening for fastening conduit to the enclosure, and a lid may be removed to gain access for wiring connections. The lid is attached with two pin-in-hex security screws. A key is provided for installation access into the conduit enclosure. Two switch options are available for the supervisory switch assembly. The first, part number 64040001, will provide a closed circuit when the valve hand wheel is in the full open position. The second option, part number 65755001, will provide an open circuit when the valve hand wheel is in the full open position. Please specify the required switch configuration when ordering. Figure 1 describes wiring details. The two switch options have different colored leads for easy identification. Part number 64040001, the closed-circuit switch, has blue and green wire leads. Part number 65755001, the open circuit switch, has yellow and orange wire leads. The solid-colored wires act as a primary wiring configuration and the striped wires act as a secondary or back up wiring configuration.

Figure - 1



Note: Supervisory switch rated for Indoor Use Only.

Sprinkler System Installation Requirements

To permit easy replacement or repair of valve, pipe unions or rubber gasketed mechanical couplings should be installed immediately upstream or downstream of the valve.

1. A relief valve of not less than 1/2 inch size is to be installed on the downstream side of each Pressure-Matic valve.
2. Pressure gauges are to be installed on the inlet and outlet sides of each pressure reducing valve.
3. Valve type should be selected to provide an outlet pressure not exceeding 165 psi at the maximum inlet pressure.

4. Upon system completion, each Pressure-Matic 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, per requirements of NFPA 13.

B. Standpipe System Applications

With their male hose thread outlet connections, the model UR-35 valves are intended for use as pressure reducing hose valves in standpipe systems. When hose racks are used, the UR-30 valves can be utilized along with a special hose nipple for support of the rack. Requirements for the installation of pressure reducing valves in standpipe systems are given in NFPA-14, Standard for the Installation of Standpipe and Hose Systems, Latest Edition.

The 2-1/2" UR-35 can be used for both Class I and Class III service, while the 1-1/2" version can used for Class II systems. 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, but in no case shall the valve discharge pressure be less than 65 psi. Class II hose valves must be limited to a maximum residual outlet pressure of 100 psi, but the minimum outlet pressure shall not be less than 65 psi.

Acceptance Tests

Upon completion of system, each Pressure-Matic hose valve shall be tested in accordance with 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 design.

III. Valve Performance Characteristics & Limitations:

A. Valve Construction & Operating Principle

The Pressure-Matic is a simple pressure reducing valve, which utilizes a hydraulic piston and cylinder assembly within the valve bonnet to allow the valve to self-throttle in response to the pressure on the downstream side of the valve. Because the piston, main stem and valve seat float freely from the manual valve stem and handwheel assembly, the valve is able to self-close under static conditions and maintain a reduced pressure under no-flow conditions, as well as under flowing conditions. Valve discharge pressure is transmitted to the top side of the piston through pressure passages in the main stem. The presence of the piston results in a net area differential which produces a hydraulic balancing force in the closed direction. The magnitude of this balancing force is in direct proportion to the hydraulic area of the piston.

The Pressure-Matic is a non-adjustable pressure reducing valve design, which means that the pressure reduction ratio of a given valve cannot be varied. However, the valves are available with any of seven (7) different piston diameters for the 2-1/2" and seven (7) for the 1-1/2" to satisfy all expected inlet/outlet pressure ratios. The valve piston size is designated by a "type" letter, ranging from "DEN" through "CN" for the 2-1/2" valves, and from "XN" through "ZZAN" for the 1-1/2" valves. Each valve "type" then provides a fixed pressure reduction ratio, meaning that the outlet pressure will always be a fixed percentage of the inlet pressure, regardless of inlet pressure. It should be noted, however, that this pressure reduction ratio will tend to decrease with increase of flow rate through the valve. This behavior results due to friction loss through the valve.

B. Valve Type Selection

To determine the correct type (bonnet) for each Pressure-Matic valve in the system design, please use the following steps.

1. Determine the standpipe or sprinkler riser residual pressure for each valve location. This is the inlet pressure at each valve under design flow conditions. To accurately determine these pressures, complete water supply data will be required, including results of municipal supply flow test, and the pump performance curve. The Pressure-Matic inlet pressure will be equal to the sum of the pump discharge pressure and the municipal supply pressure at the design flow rate, less piping friction loss, and elevation loss.
2. Turn to the appropriate valve performance chart (Figs. I through XXVIII), based on valve size and body style. The valve flow range for each chart is indicated in the chart title. Be sure to use the correct chart for the designed flow rate through the valve.
3. Locate the valve inlet residual pressure on the vertical axis of the chart and draw a line from this pressure horizontally across the chart.
4. Locate the desired valve outlet residual pressure on the chart horizontal axis and draw a vertical line from this pressure across the chart.
5. From the intersection of the inlet and outlet pressure lines constructed in (3) and (4) above, move horizontally to the nearest valve performance curve (straight diagonal lines). This will be the appropriate valve for the chosen location.

   EXAMPLE: The residual inlet pressure at a straight pattern sprinkler system floor control valve is 275 psi at a design flow demand of 250 GPM. The desired residual outlet pressure is 120 psi. On the appropriate chart (Fig. XVII) it is seen that the intersection of the residual inlet and outlet pressure lines fall very close to the performance curve (straight line) for the "DEN" valve. Therefore, the "DEN" valve would be chosen, and would provide an actual residual outlet pressure of 108 psi.
6. Determine the valve static inlet pressure. This will be the sum of the municipal supply static pressure plus the pump churn pressure, less elevation loss.
7. To determine the valve static outlet pressure, refer to the appropriate static chart (Fig. XI, XXII, or XXVIII). Locate the valve static inlet pressure on the vertical axis of the chart. Follow across to the appropriate valve curve (straight line) and drop down to the horizontal axis to read valve outlet static pressure.

   EXAMPLE: For the valve in step (5) above, the static inlet pressure is 290 psi. Follow the 290 psi inlet pressure line across the chart horizontally to the "DEN" curve. Read the outlet static pressure of 162 psi on the horizontal axis directly below the point of intersection.

NOTE: If static outlet pressure is found to exceed the maximum outlet pressure allowed by NFPA 13 or NFPA 14, it will be necessary to re-select a valve type to the left of the originally chosen type.

IV. Valve Care & Maintenance:

Pressure-Matic valves require minimal maintenance and can normally serve reliably for twenty years or longer in fire protection systems. However, a routine inspection and testing program is essential for any fire protection system to ensure that it is in proper operating condition. NFPA 25, Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems should be consulted for a determination of required test frequency and methods.

Flow test results should be compared to previous test results, and to system performance criteria. Because the Pressure-Matics are non-adjustable type valves, test results should not vary significantly from previous test results unless the water supply or pump characteristics have changed, resulting in a higher or lower inlet pressure to the Pressure-Matic valve. If changes to the water supply result in unsatisfactory performance of the PRV, the valve may be replaced with a different type to achieve a different reduction ratio.

For information on bonnet subassembly replacement or on any repair parts, please contact:

Elkhart Brass

Manufacturing

Company, Inc.

Elkhart, IN 46514

+1 574-295-8330

Pressure Charts

NOTE: The outlet pressure shown on the following charts are subject to a tolerance of ±10%.

Fig. I Model UR-30S 2-1/2" - 500 GPM

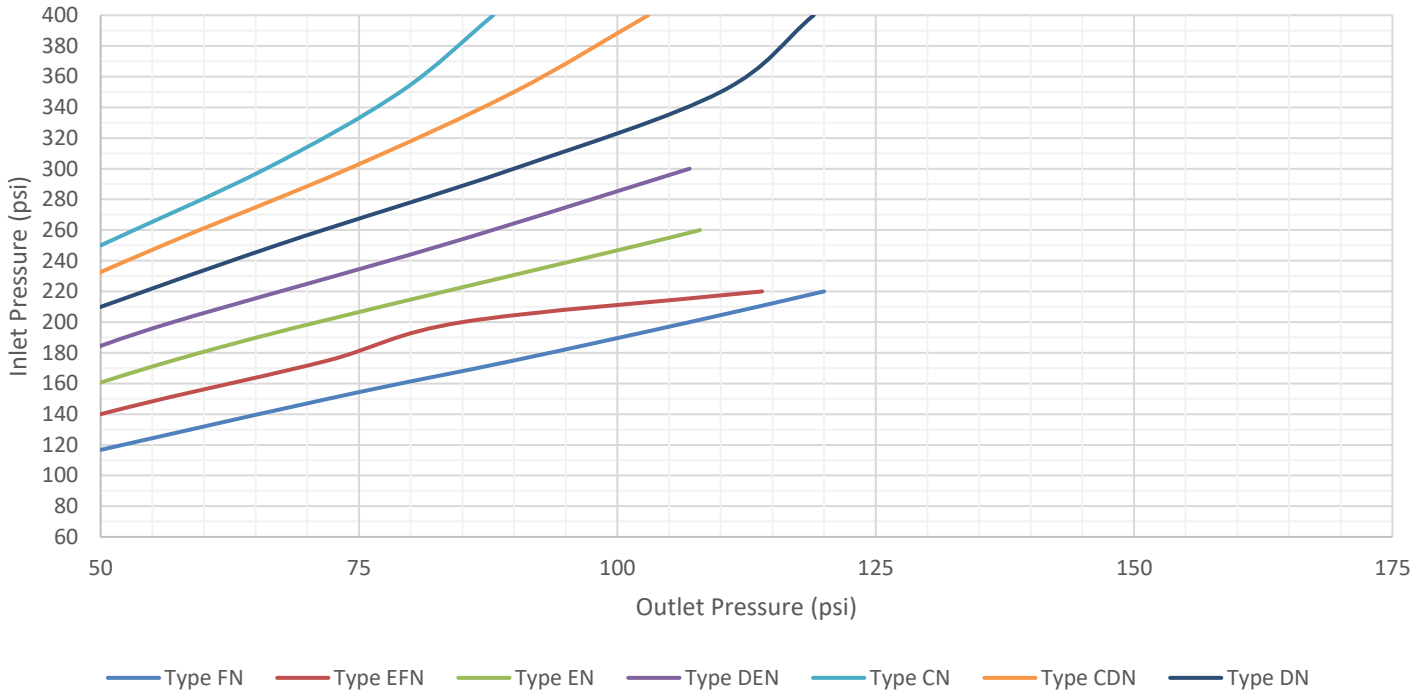


Fig. II Model UR-30S 2-1/2" - 450 GPM

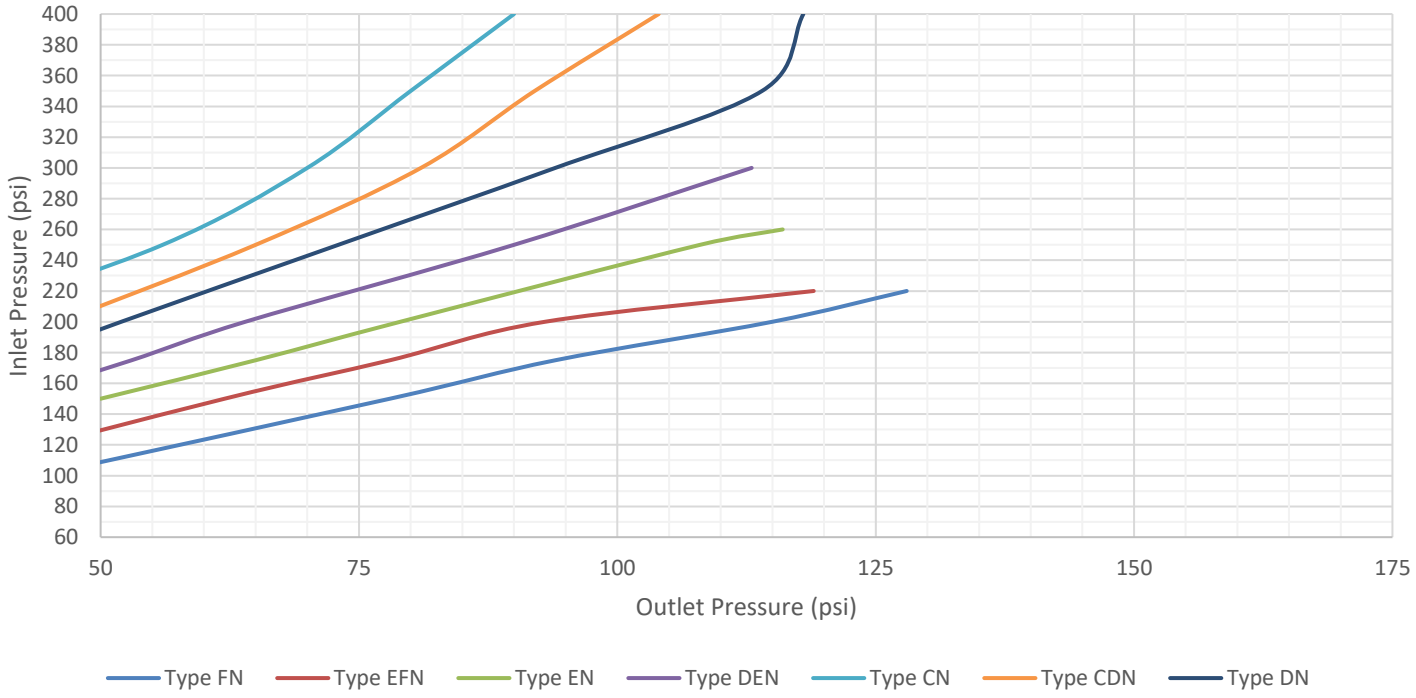


Fig. III Model UR-30S 2-1/2" - 400 GPM

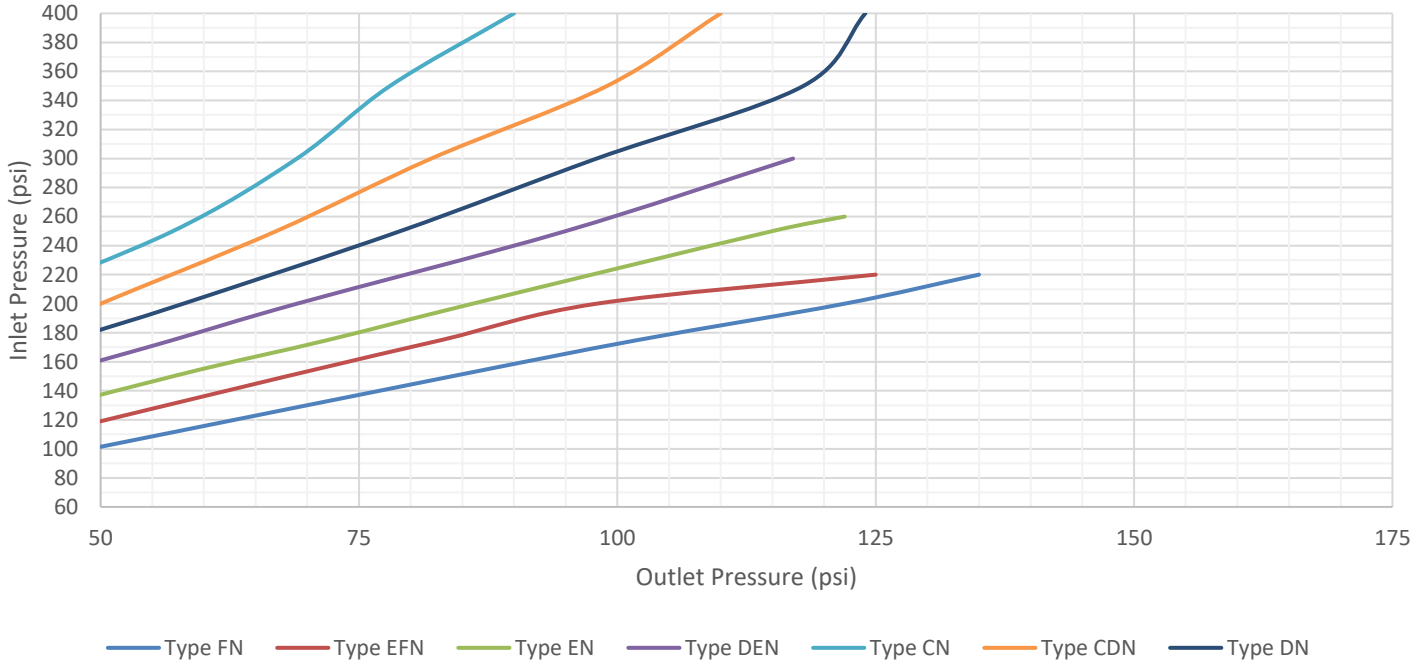


Fig. IV Model UR-30S 2-1/2" - 350 GPM

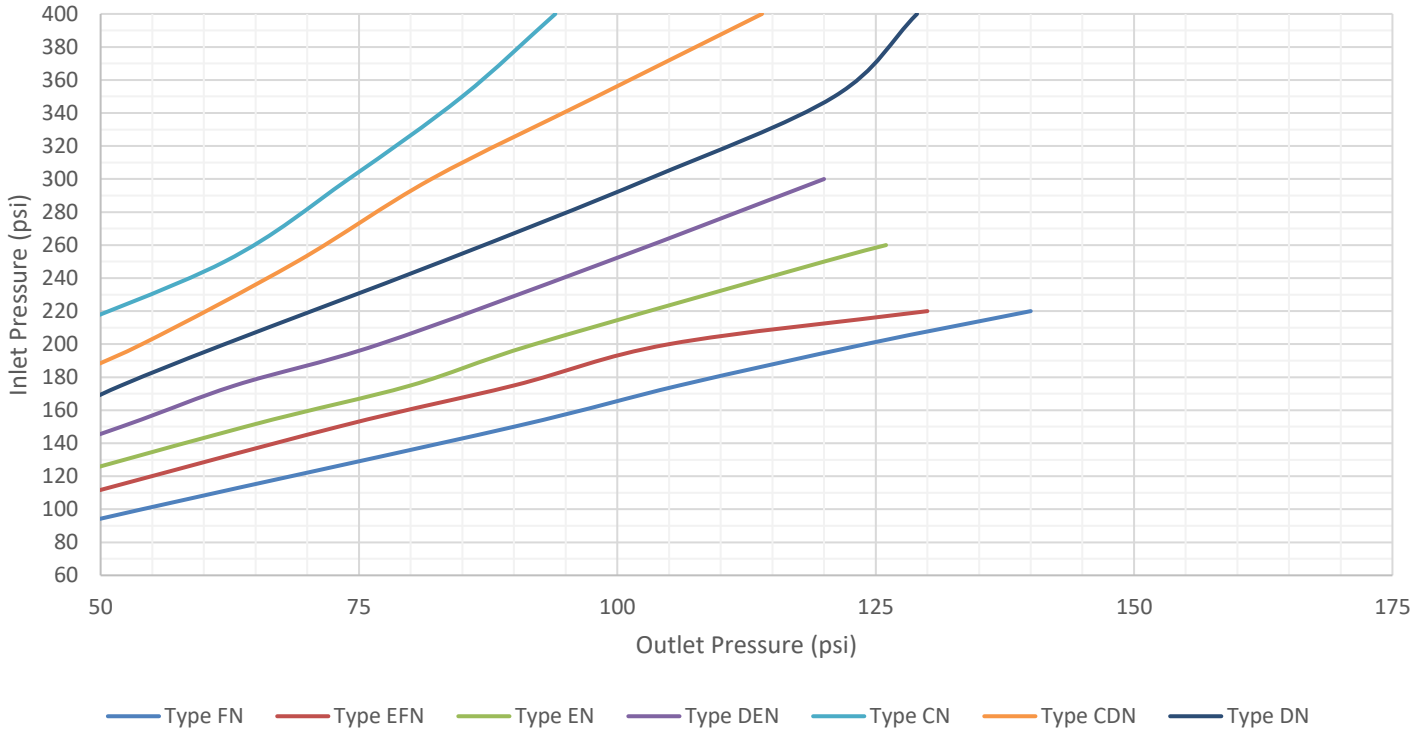


Fig. V Model UR-30S 2-1/2" - 300 GPM

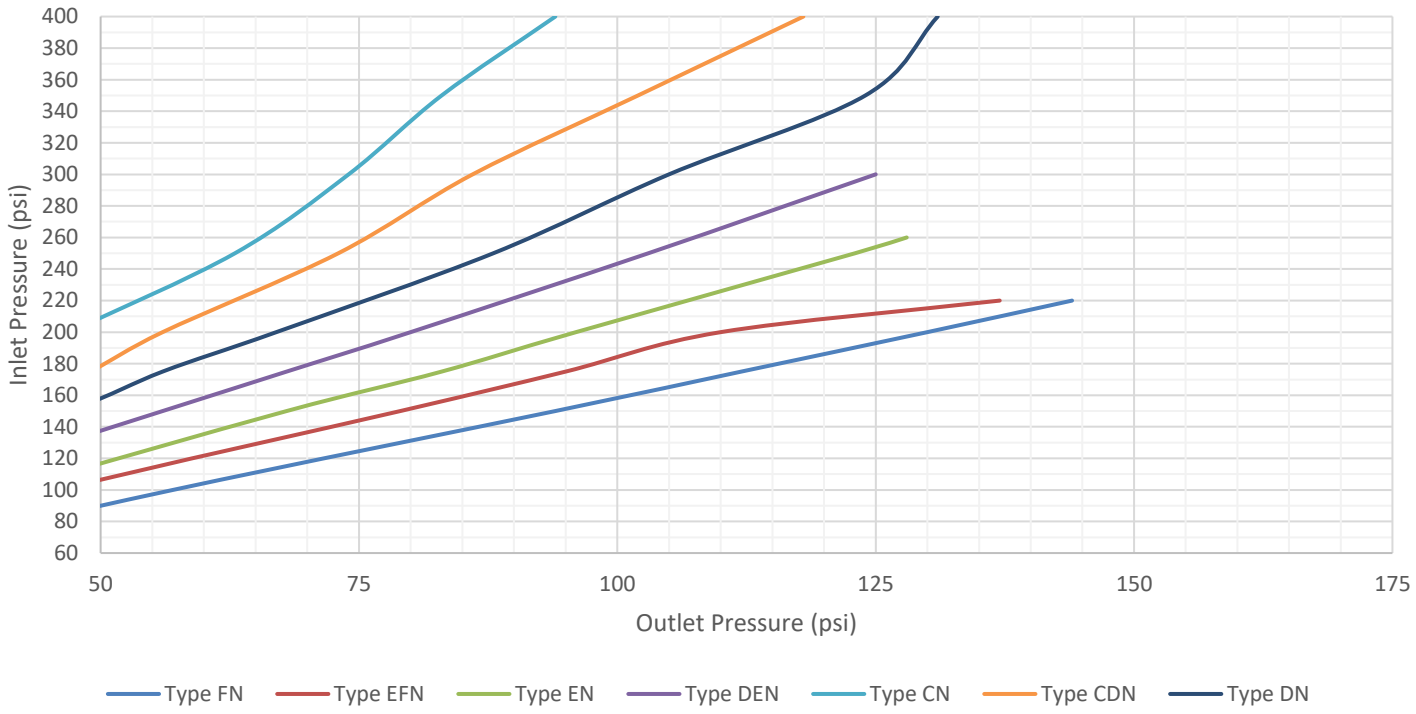


Fig. VI Model UR-30S 2-1/2" - 250 GPM

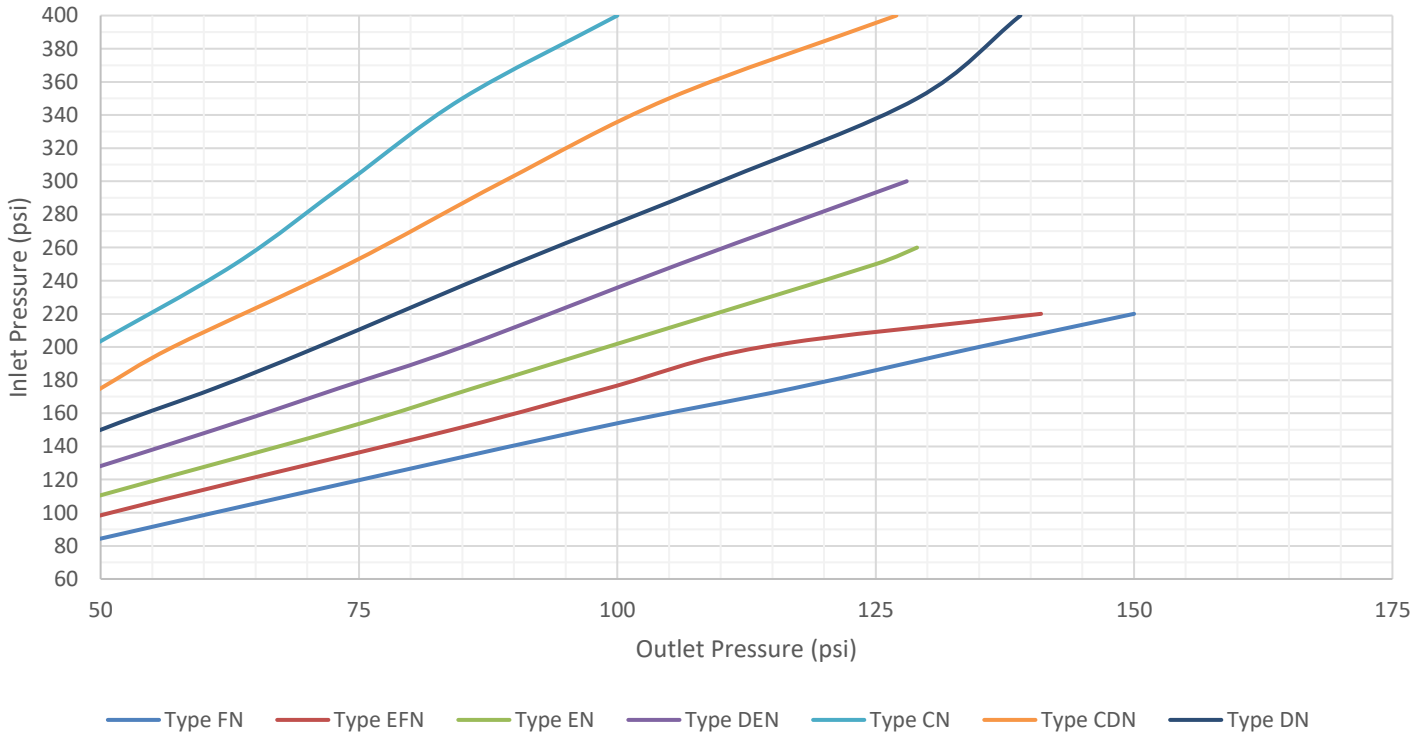


Fig. VII Model UR-30S 2-1/2" - 200 GPM

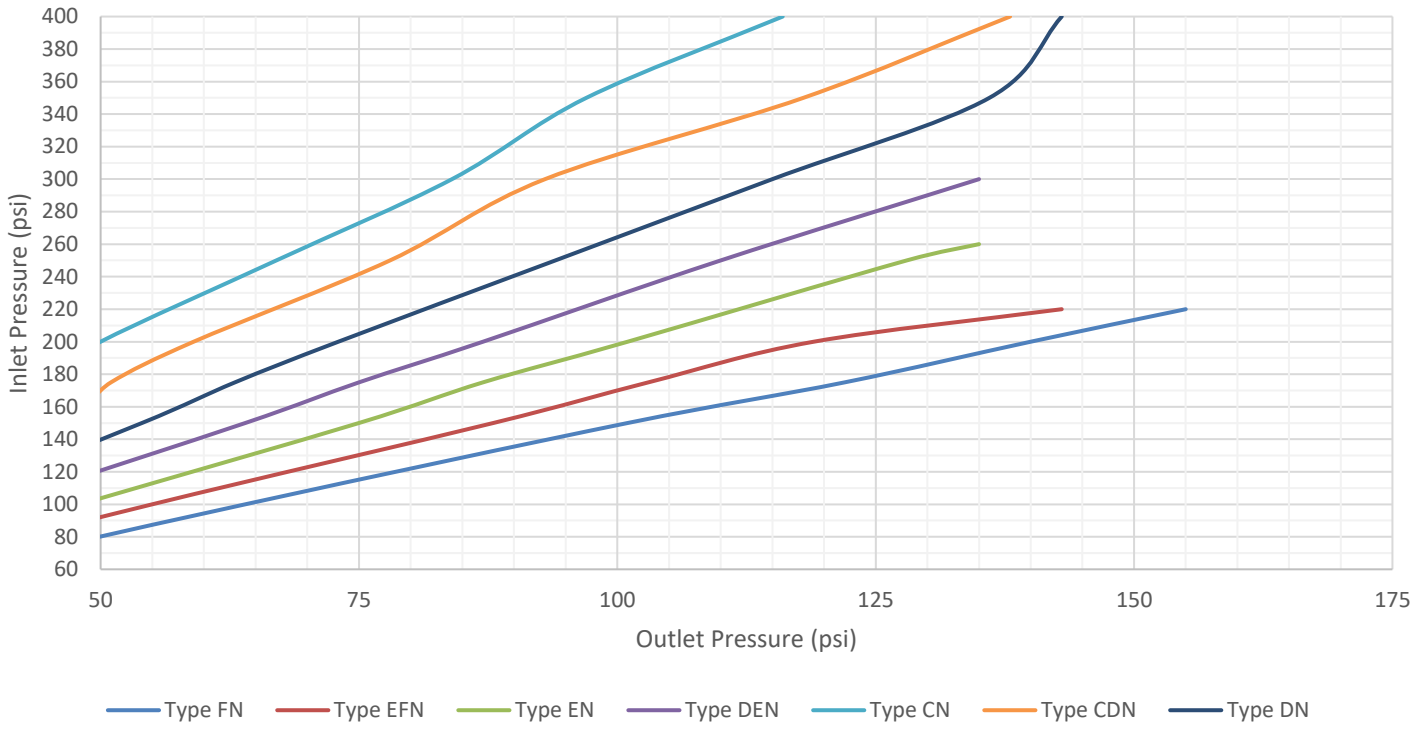


Fig. VIII Model UR-30S 2-1/2" - 150 GPM

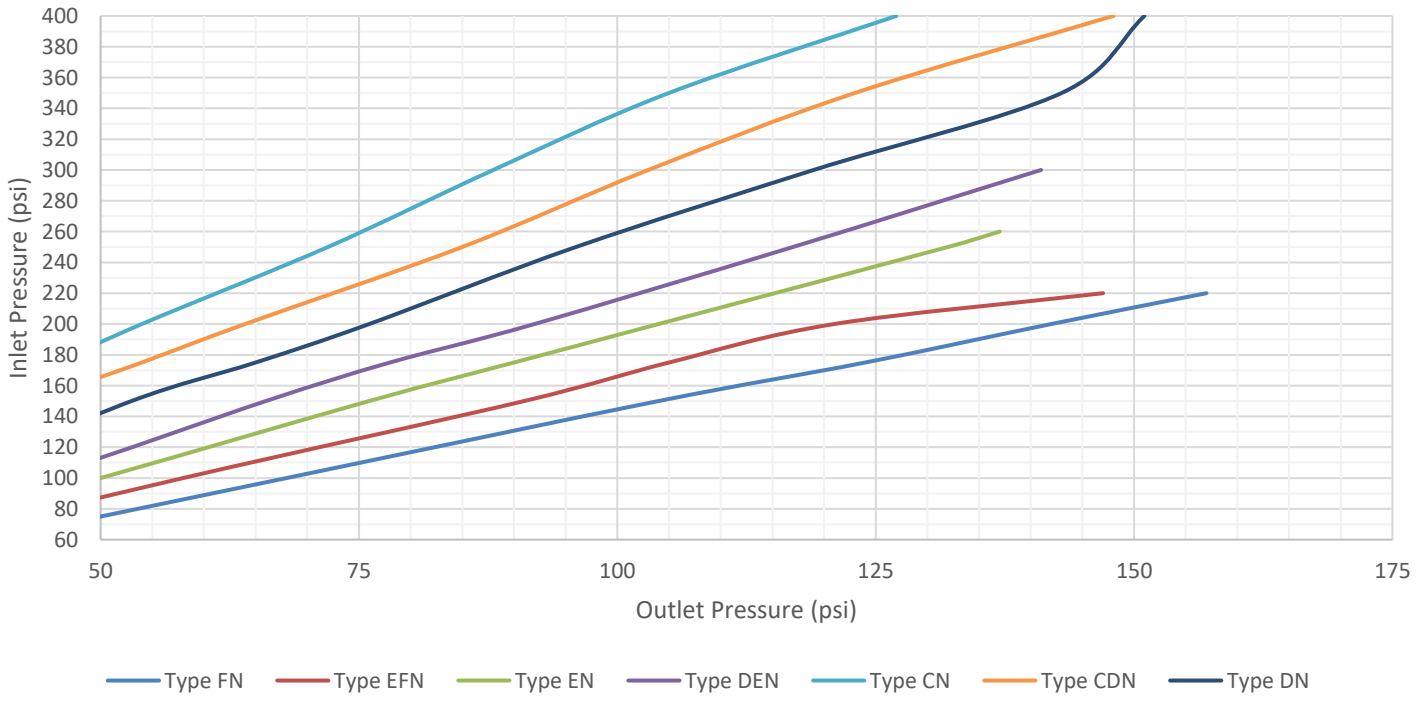


Fig. IX Model UR-30S 2-1/2" - 100 GPM

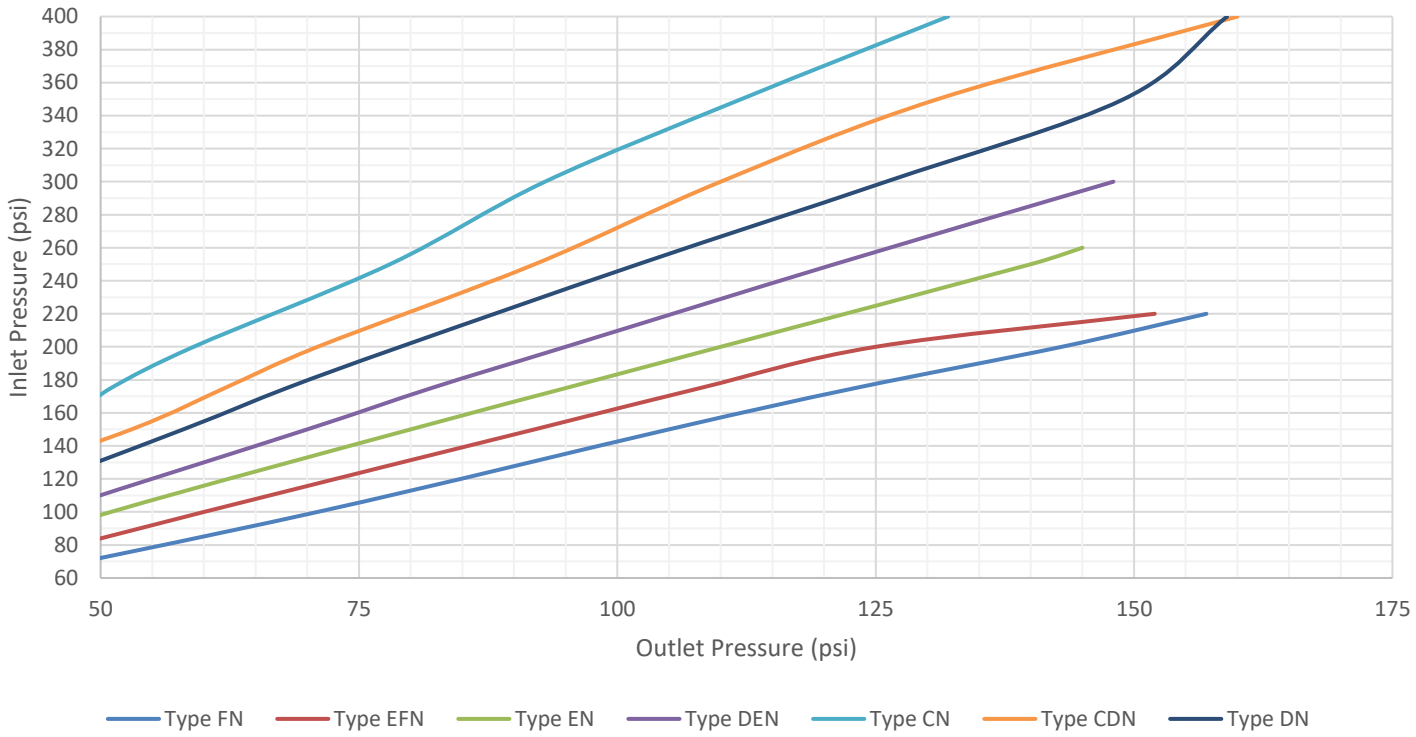


Fig. X Model UR-30S 2-1/2" - 50 GPM

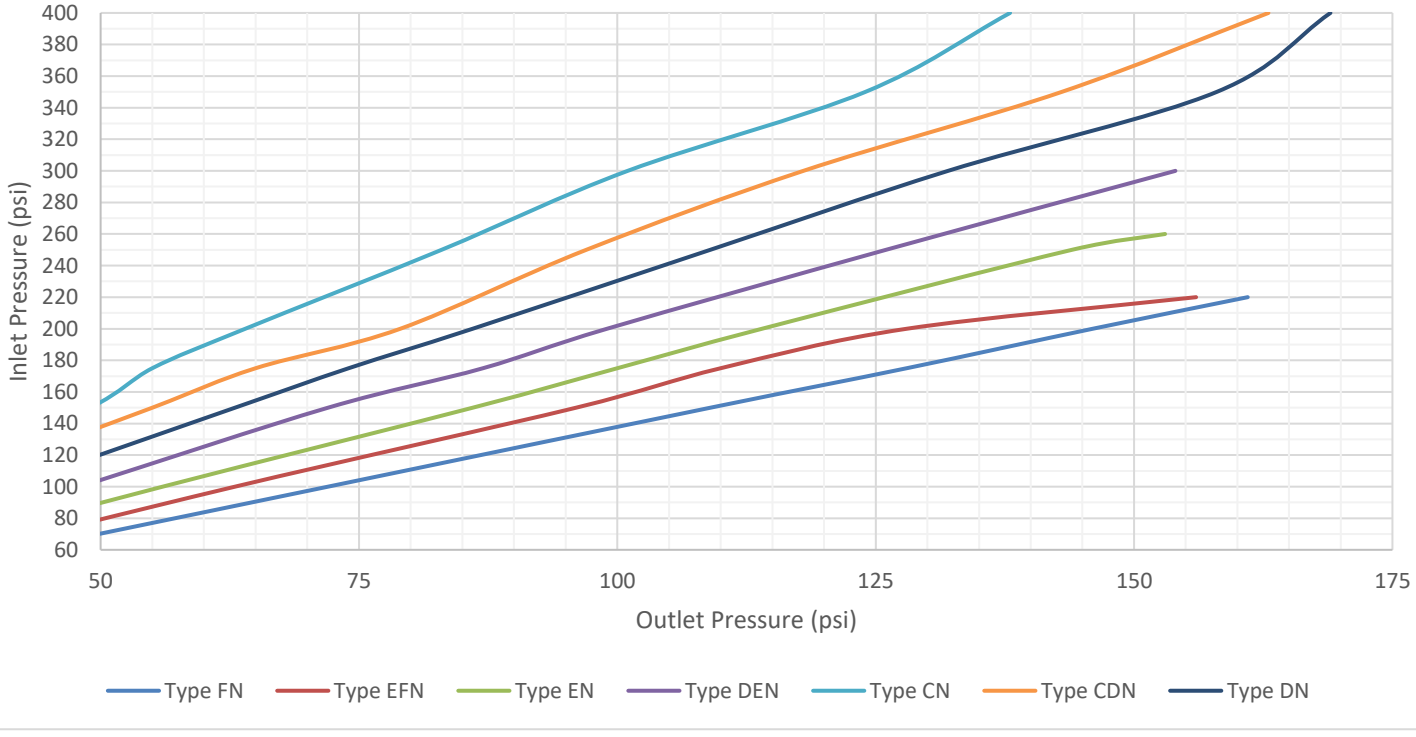


Fig. XI Model UR-30S 2-1/2" - STATIC

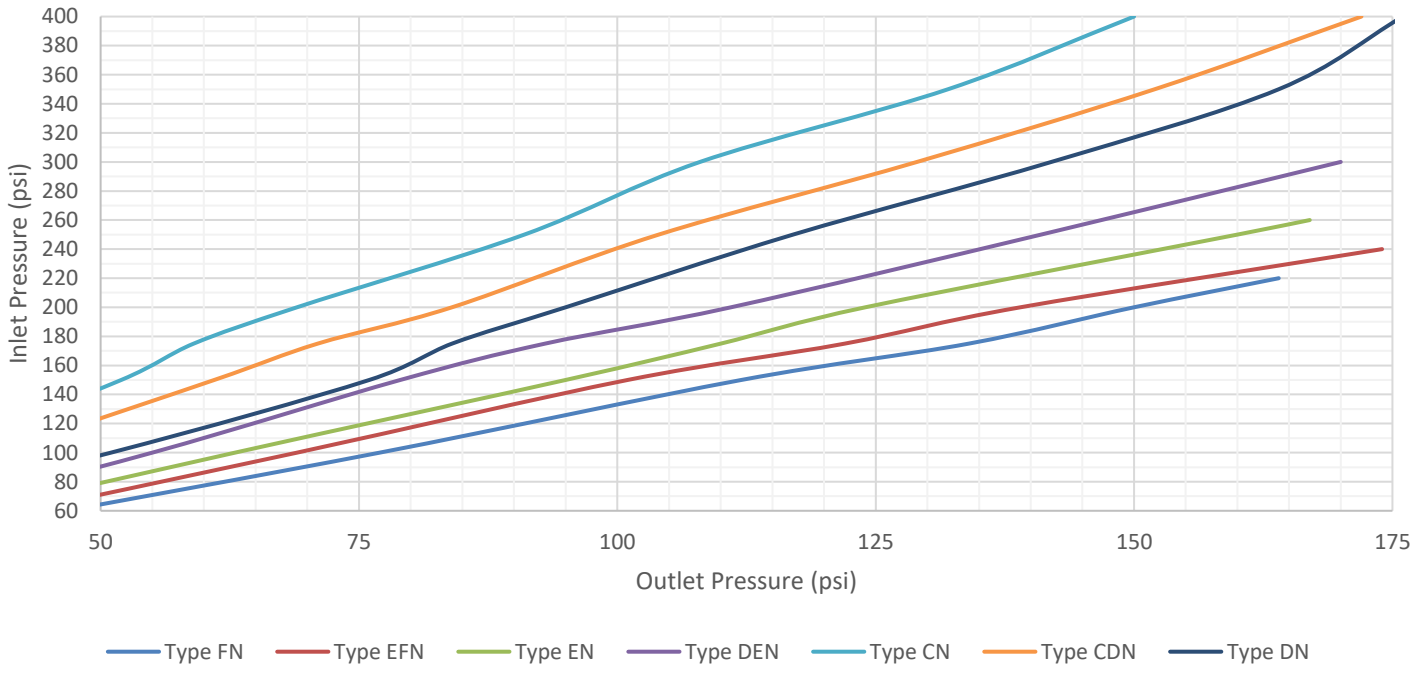


Fig. XII Model UR-30 & 35, 2-1/2" - 500 GPM

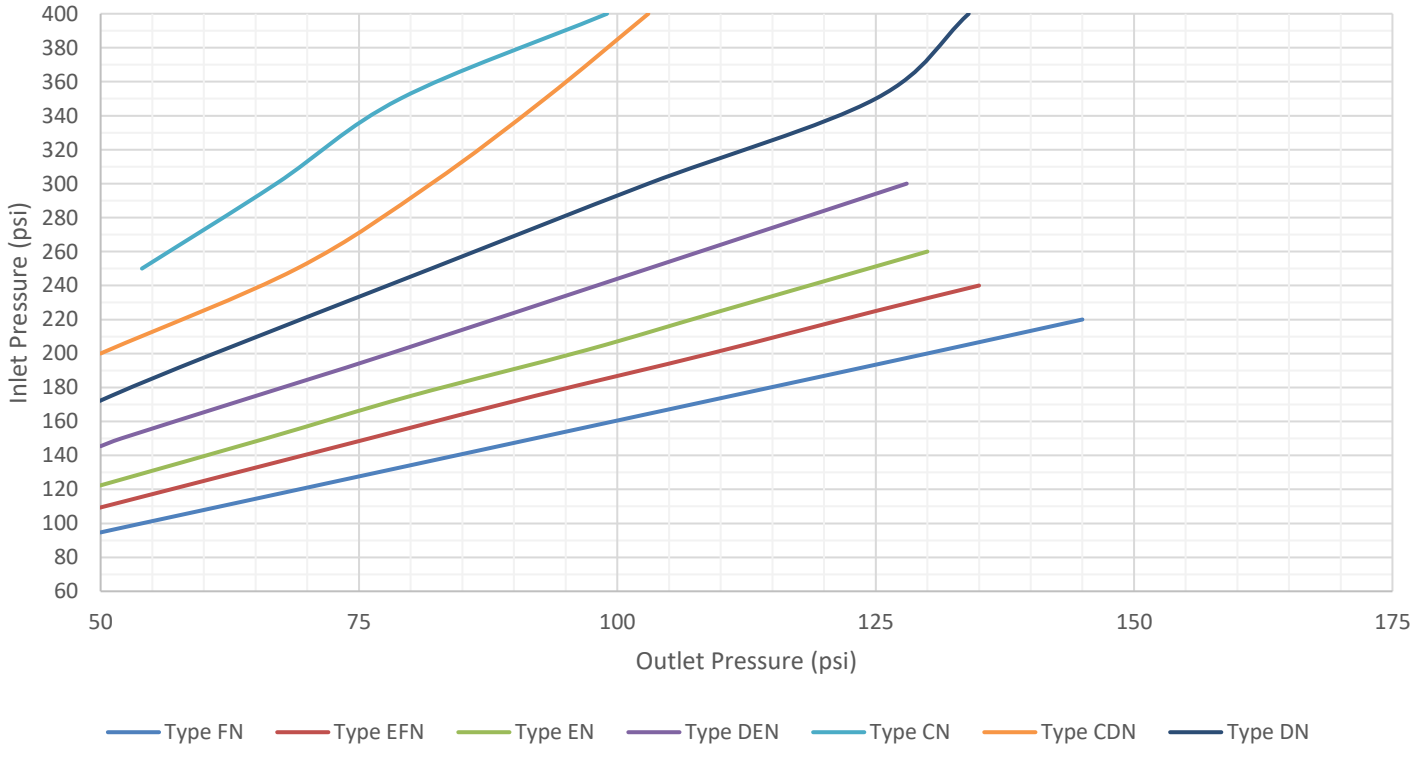


Fig. XIII Model UR-30 & 35, 2-1/2" - 450 GPM

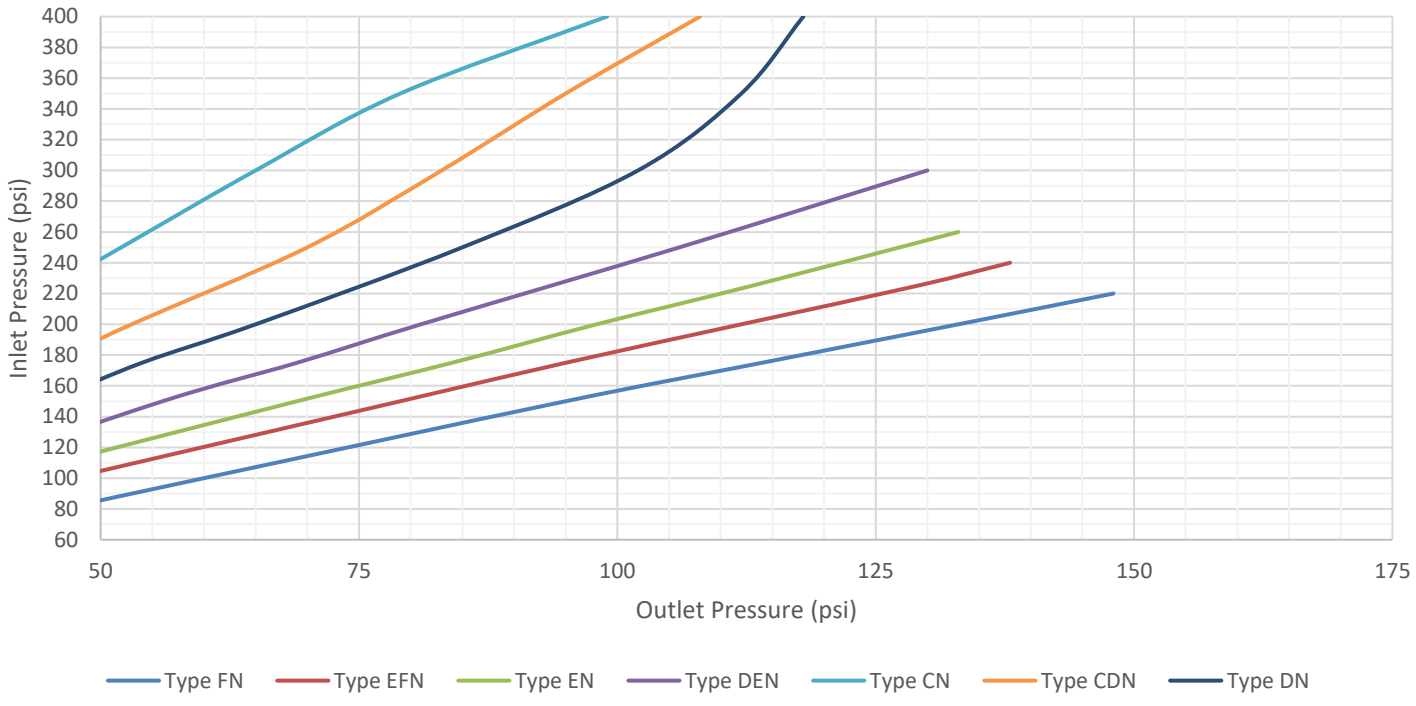


Fig. XIV Model UR-30 & 35, 2-1/2" - 400 GPM

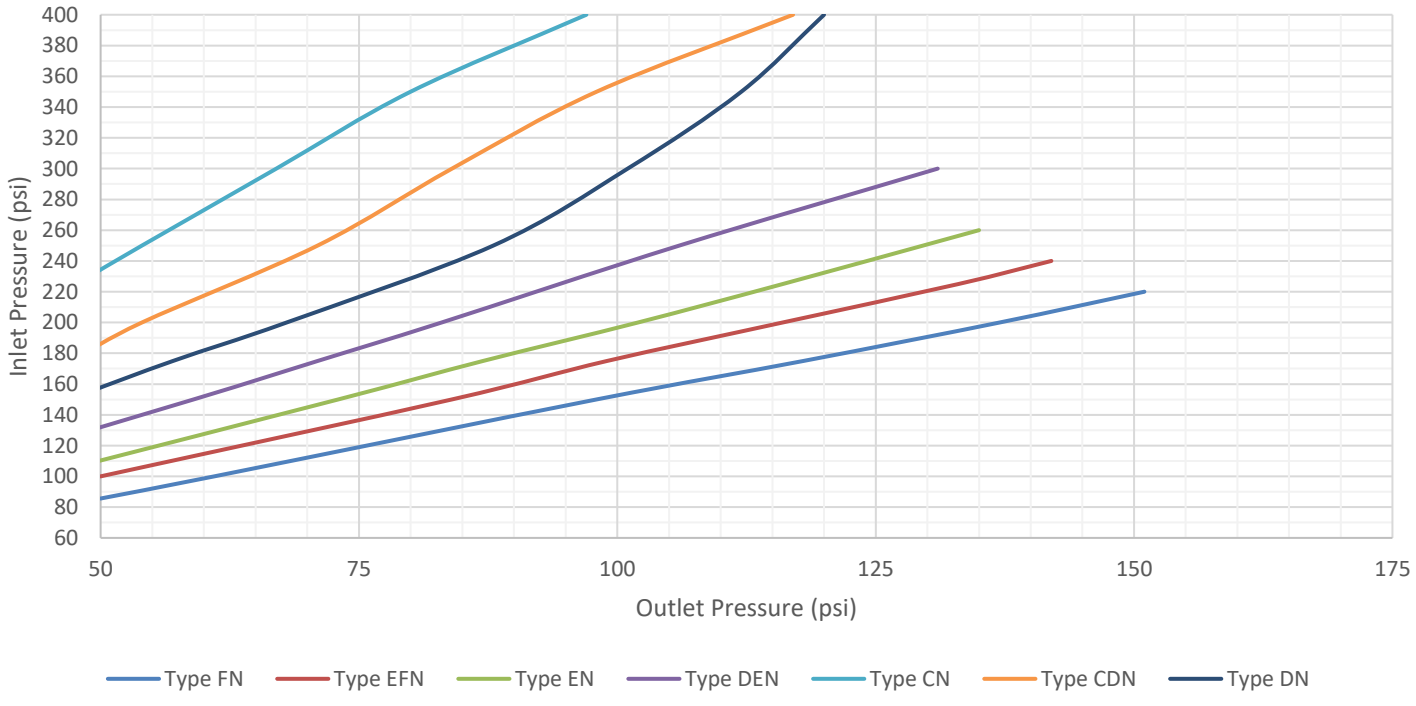


Fig. XV Model UR-30 & 35, 2-1/2" - 350 GPM

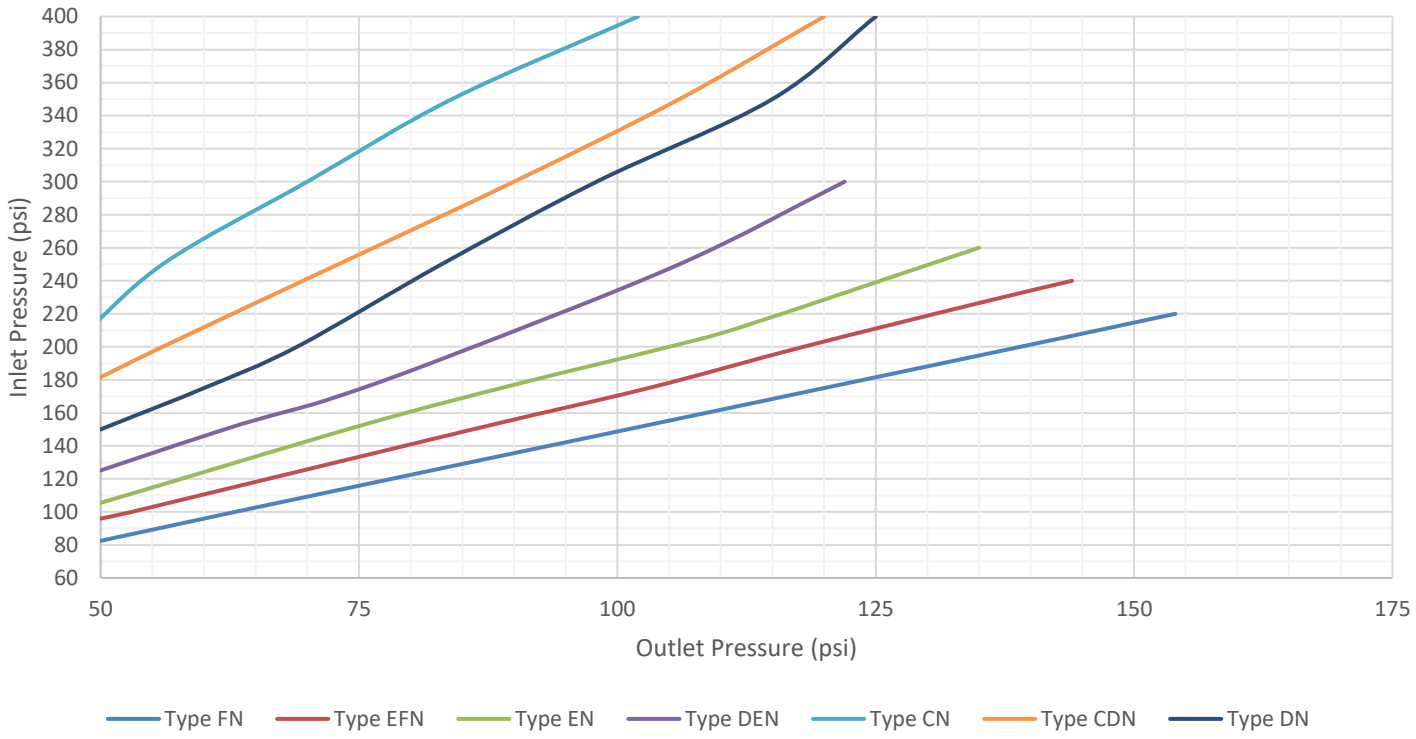


Fig. XVI Model UR-30 & 35, 2-1/2" - 300 GPM

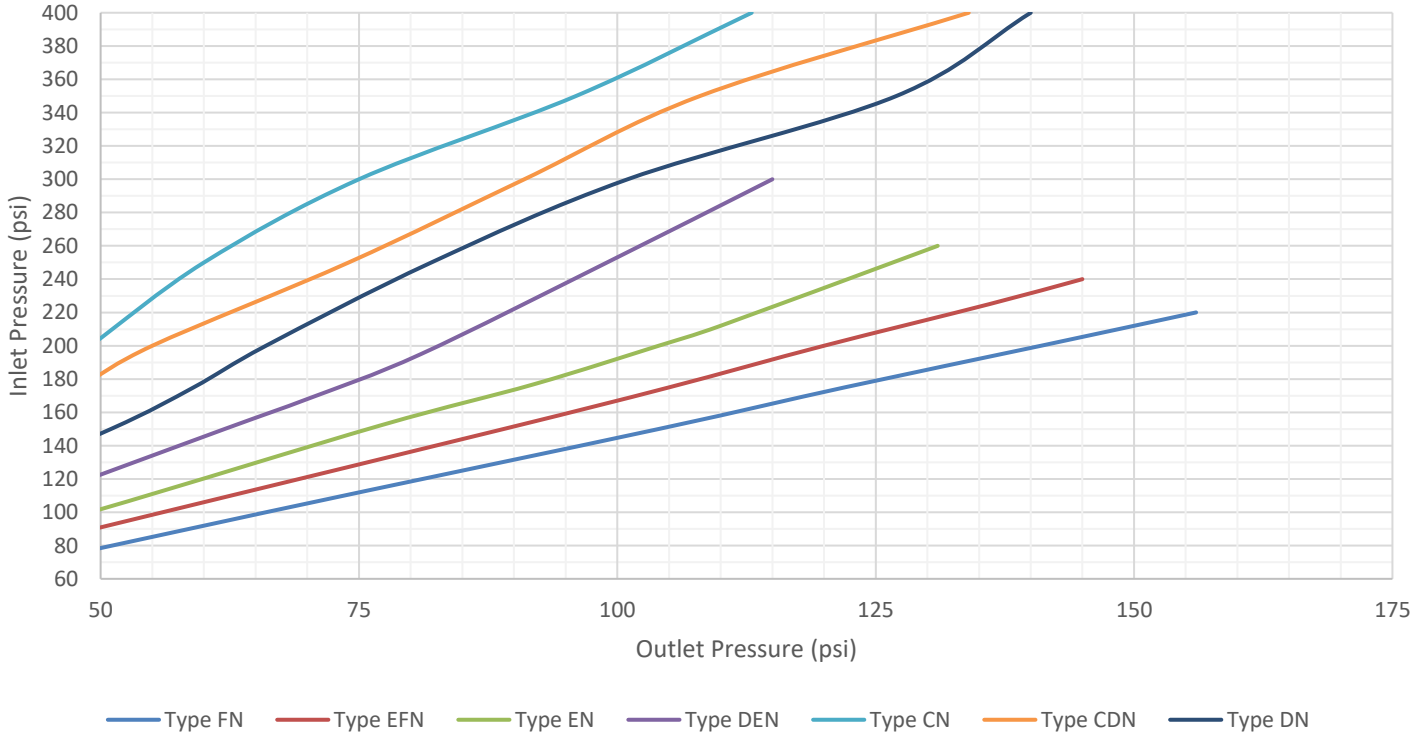


Fig. XVII Model UR-30 & 35, 2-1/2" - 250 GPM

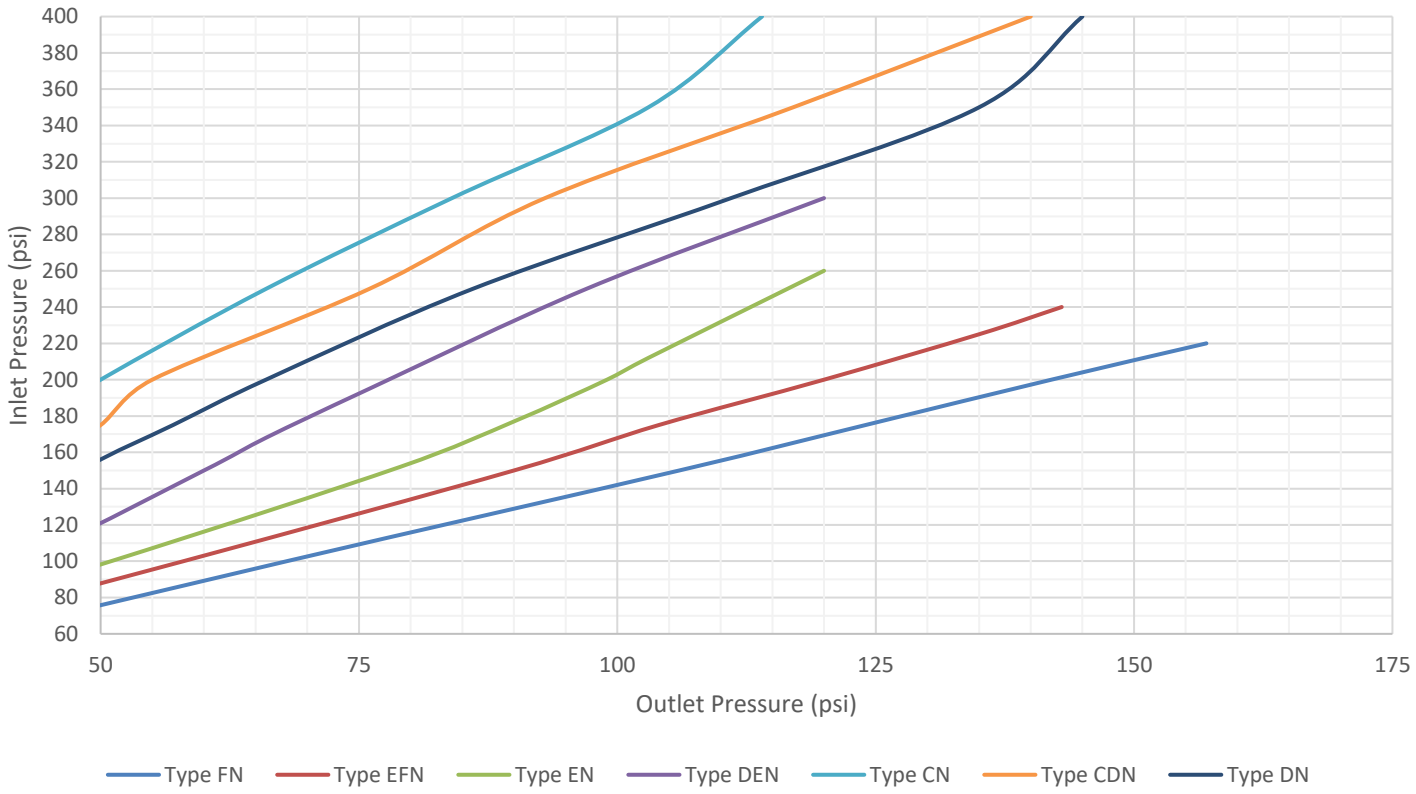


Fig. XVIII Model UR-30 & 35, 2-1/2" - 200 GPM

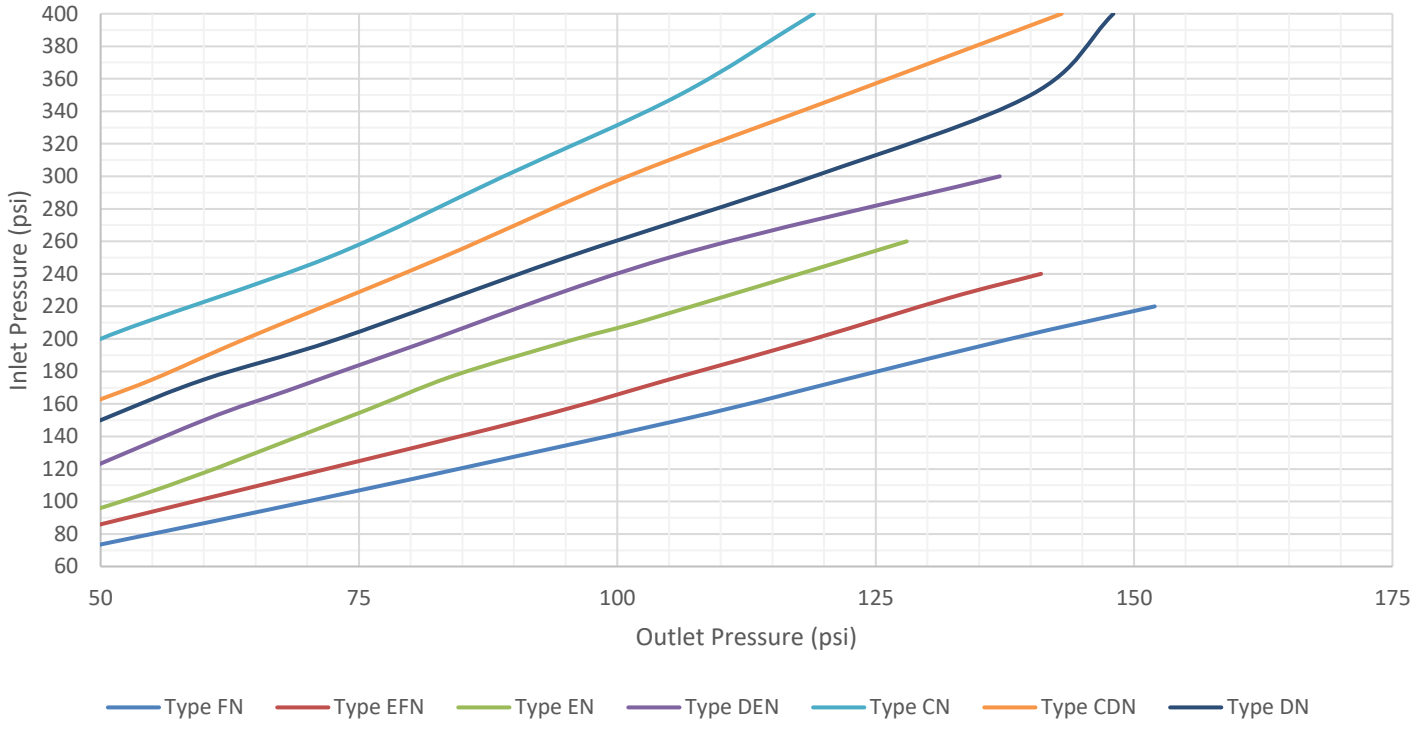


Fig. XIX Model UR-30 & 35, 2-1/2" - 150 GPM

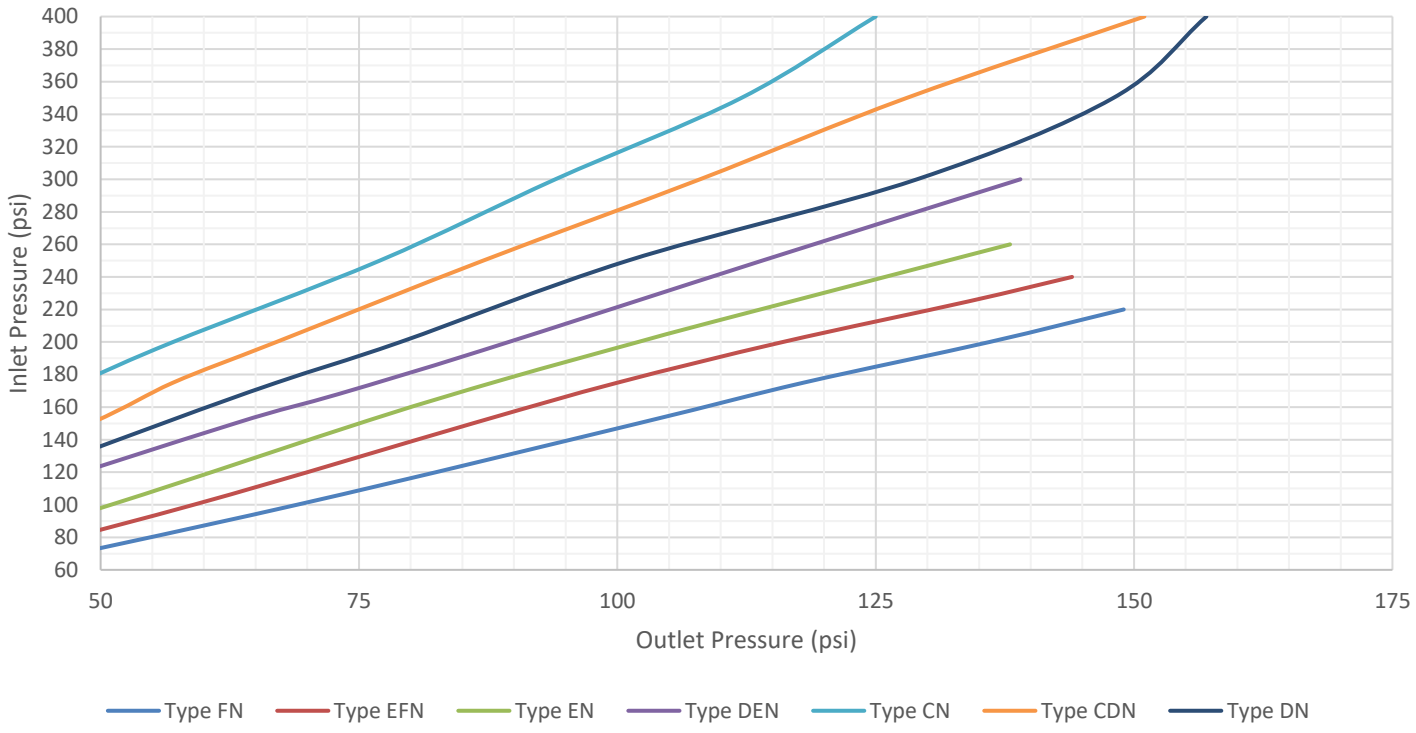


Fig. XX Model UR-30 & 35, 2-1/2" - 100 GPM

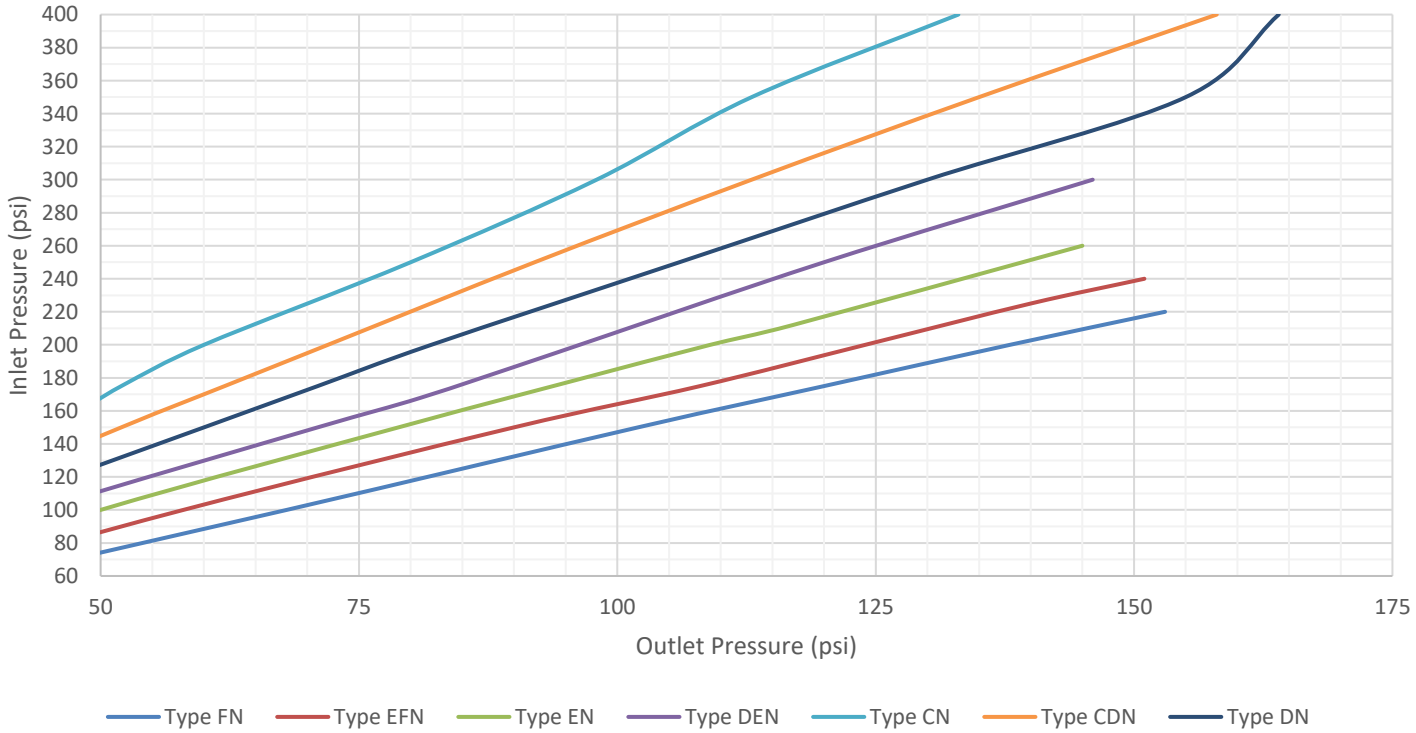


Fig. XXI Model UR-30 & 35, 2-1/2" - 50 GPM

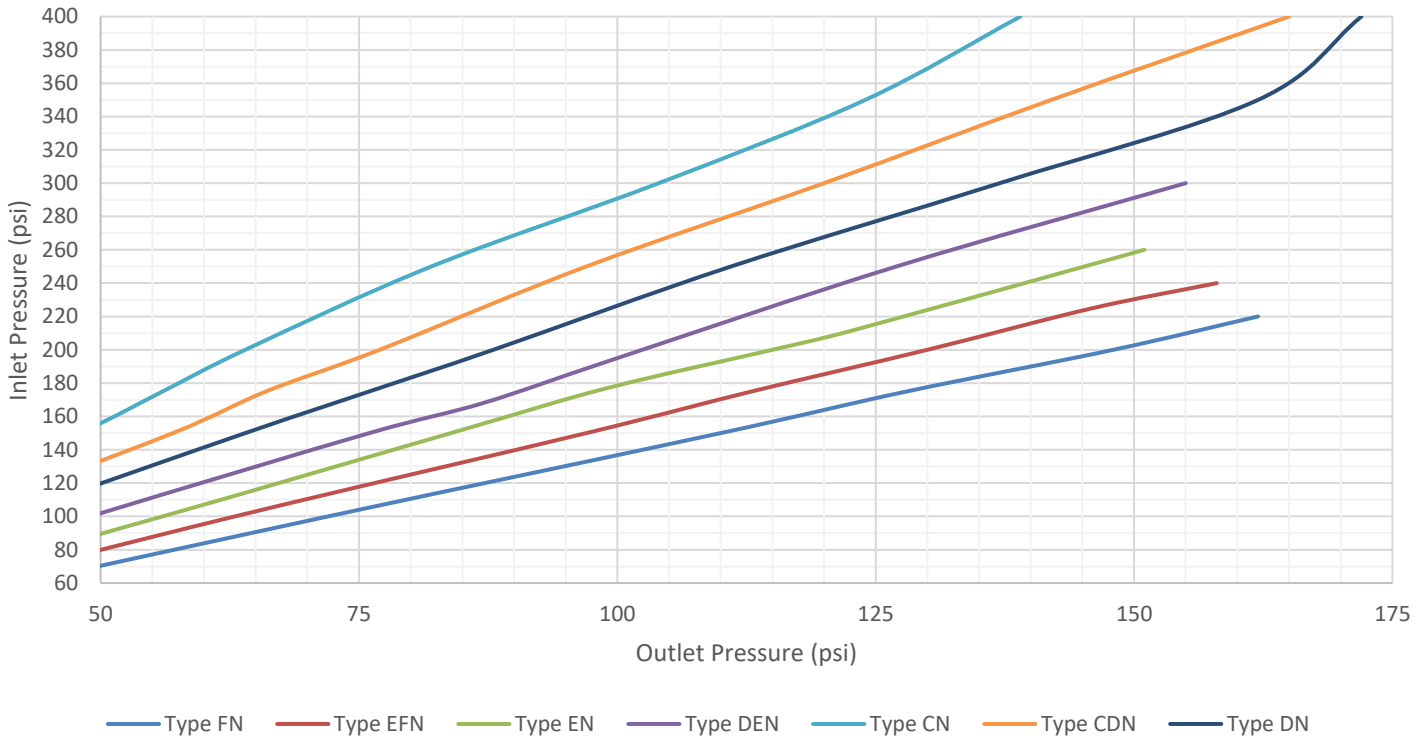


Fig. XXII Model UR-30 & 35, 2-1/2" - STATIC

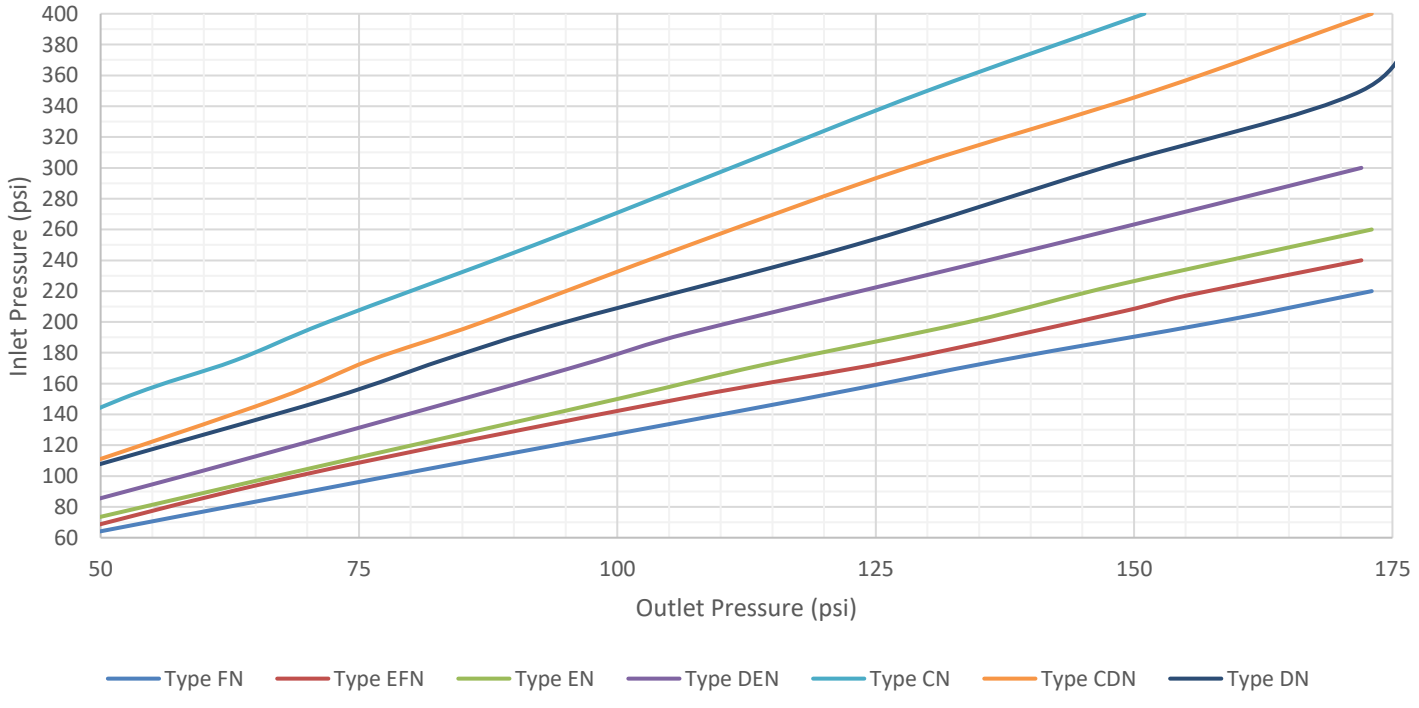


Fig. XXIII Model UR-30 & 35, 1-1/2" - 250 GPM

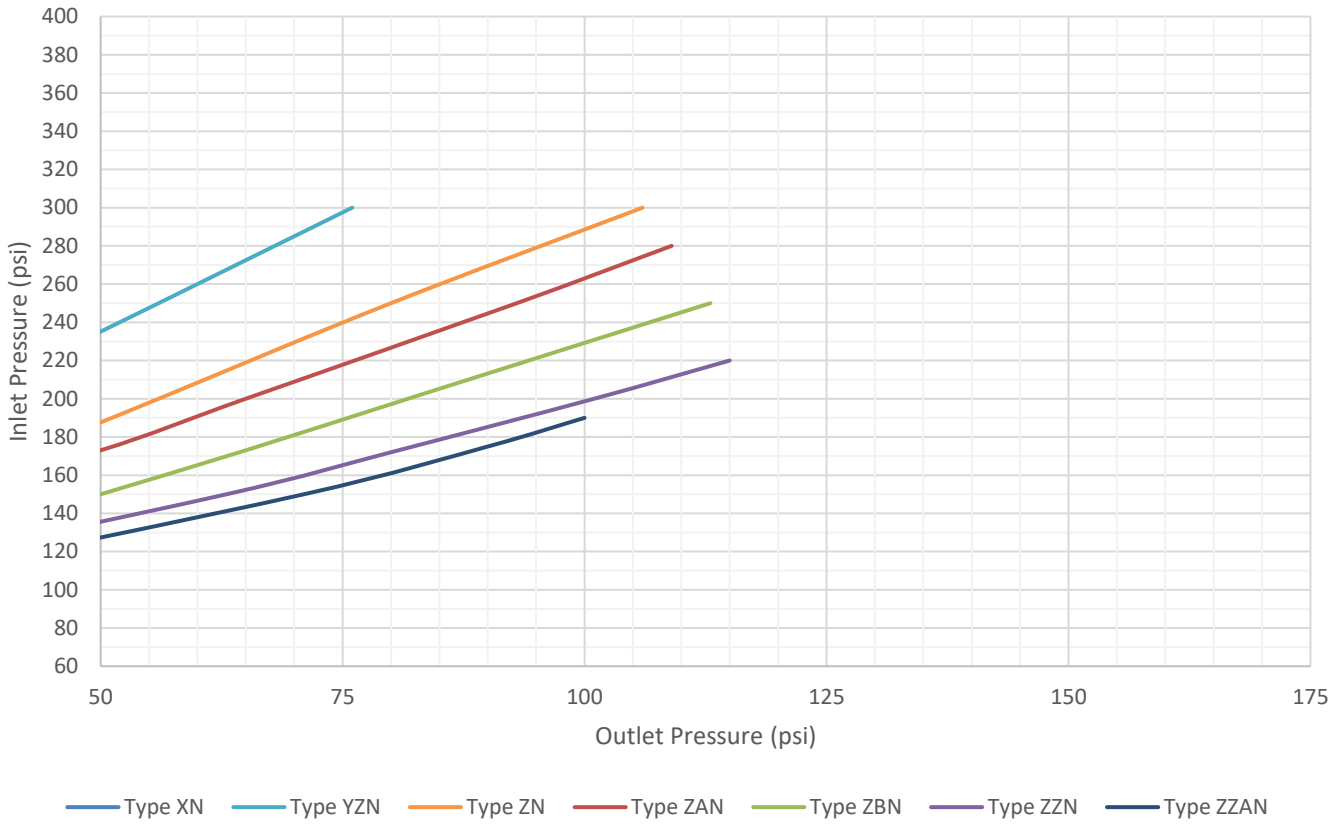


Fig. XXIV Model UR-30 & 35, 1-1/2" - 200 GPM

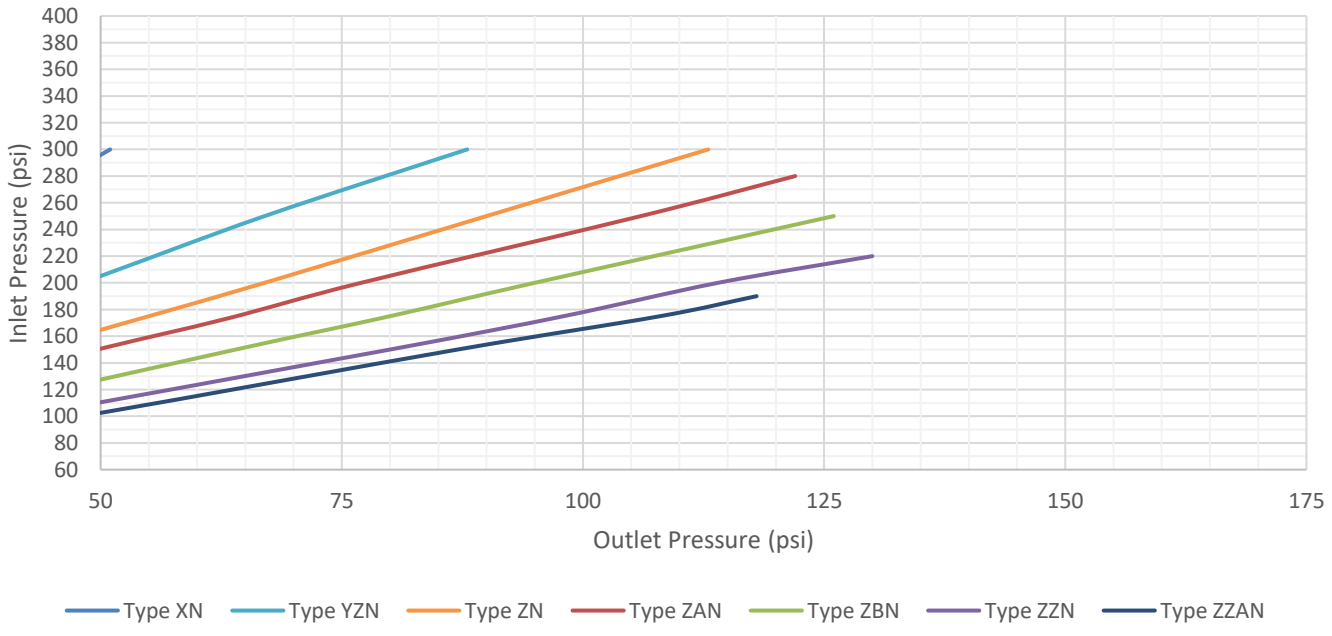


Fig. XXV Model UR-30 & 35, 1-1/2" - 150 GPM

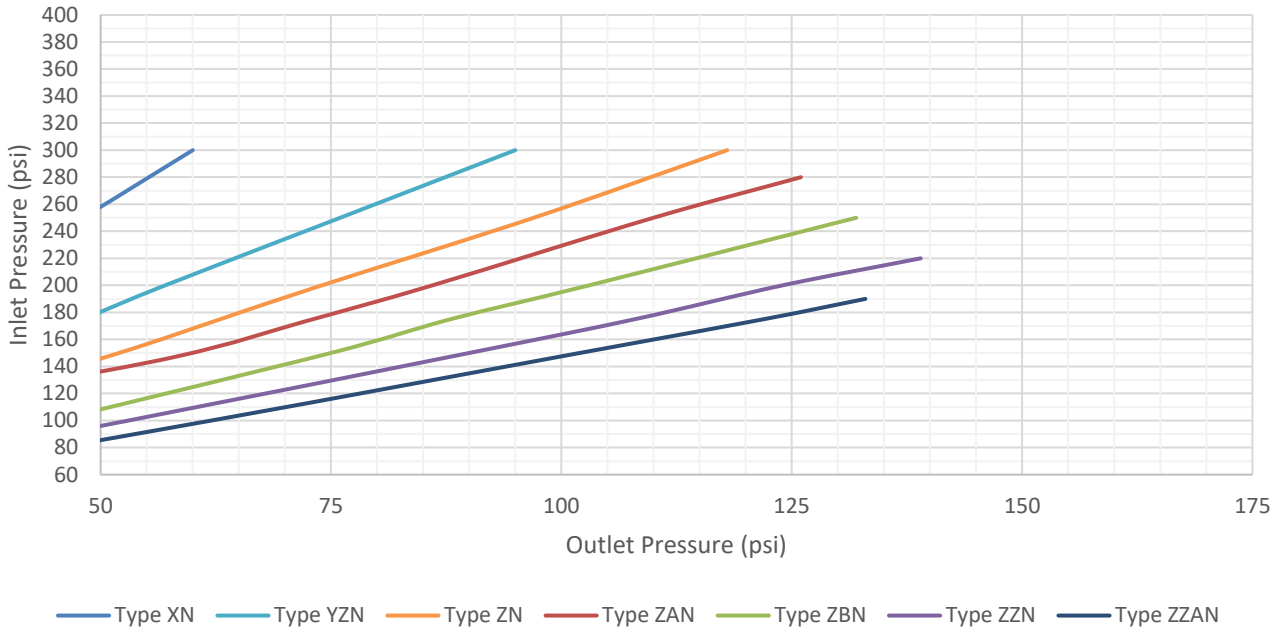


Fig. XXVI Model UR-30 & 35, 1-1/2" - 100 GPM

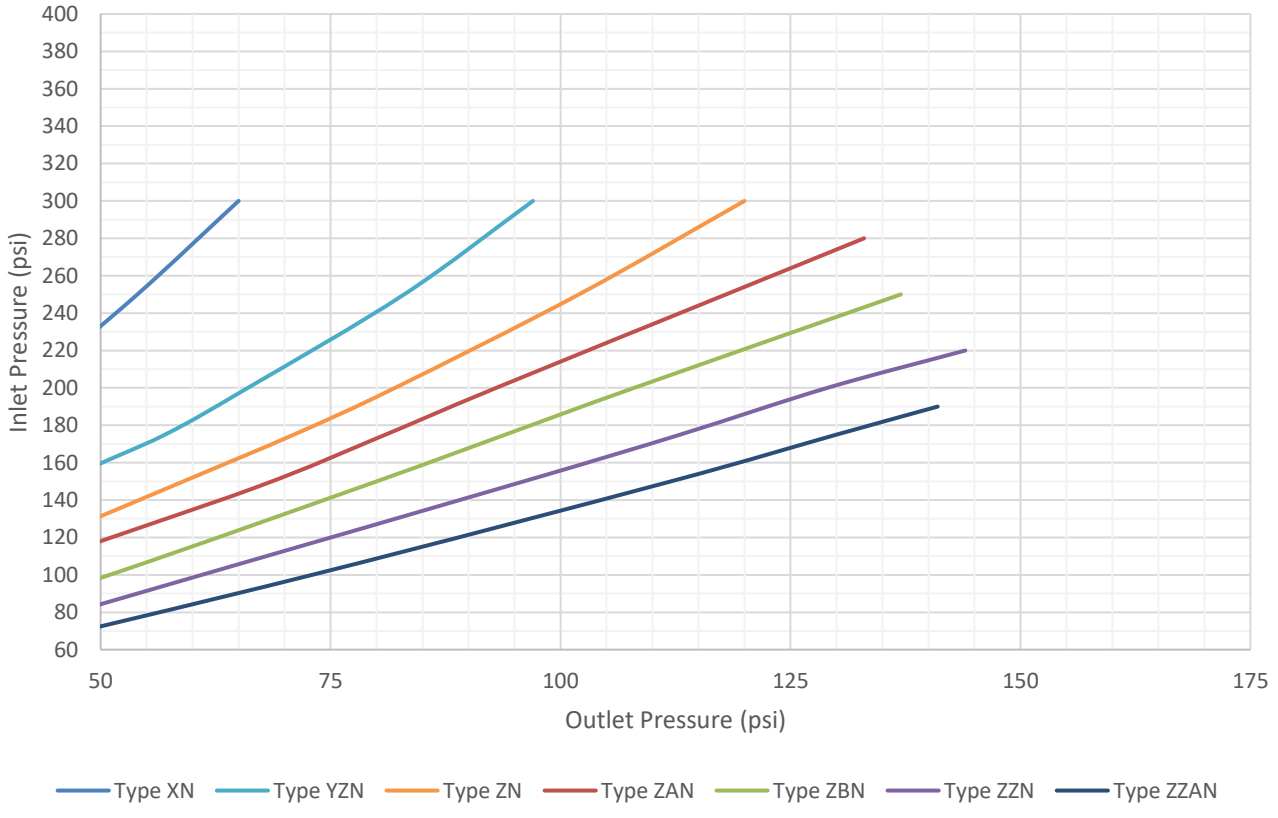


Fig. XXVII Model UR-30 & 35, 1-1/2" - 50 GPM

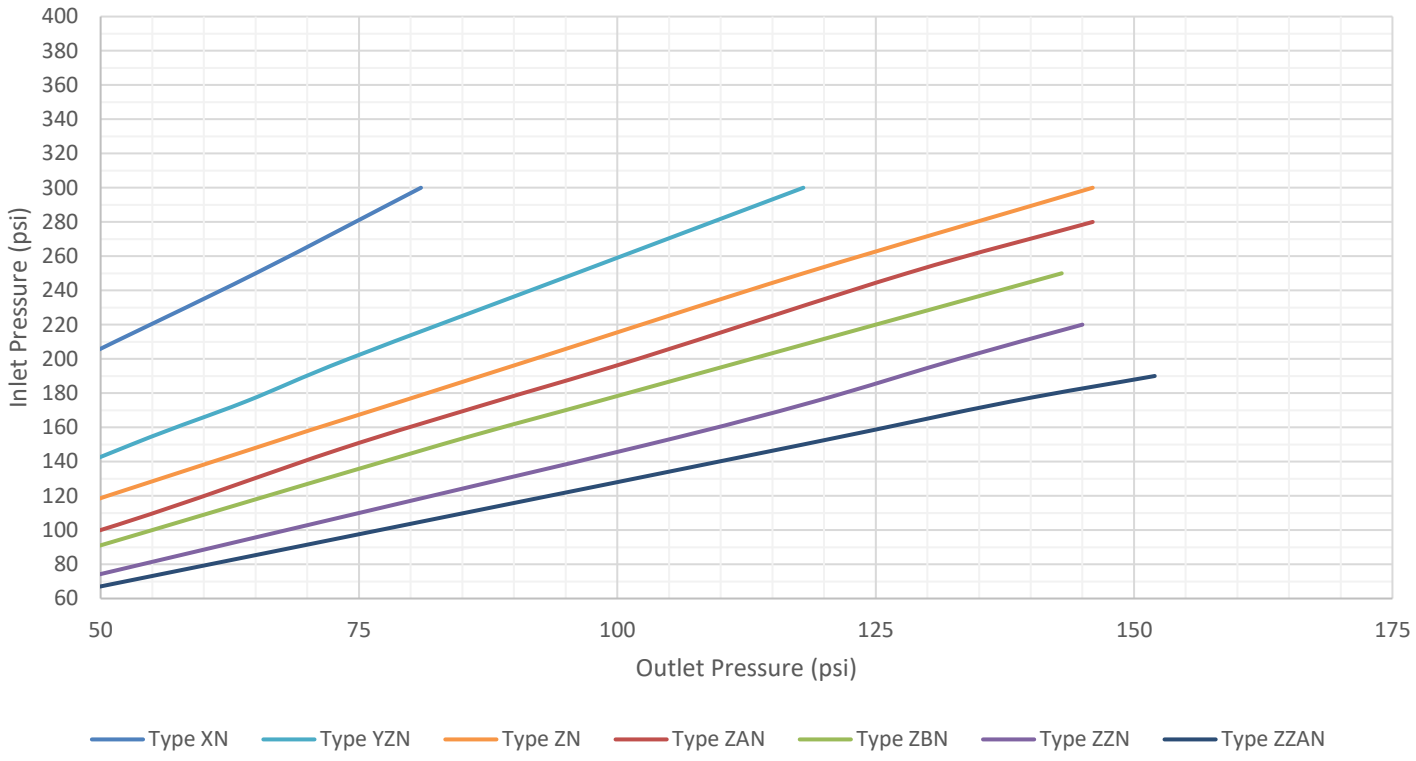
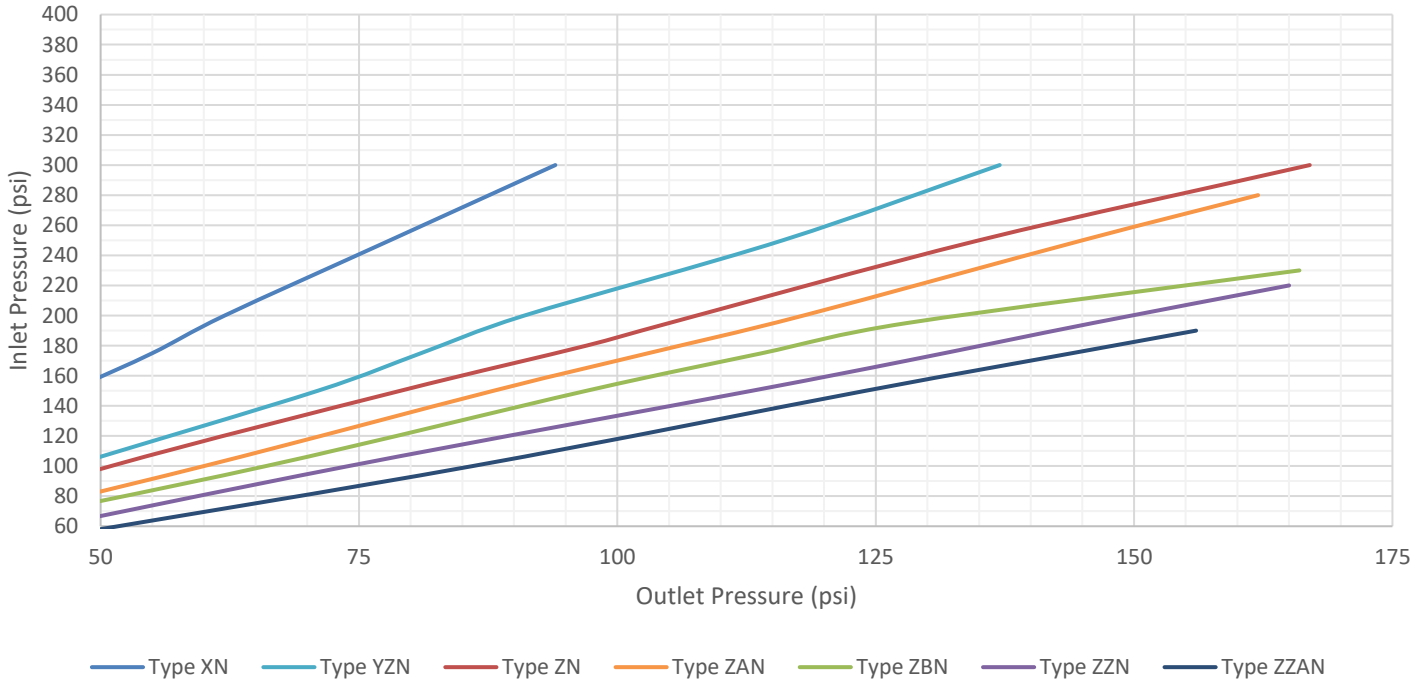


Fig. XXVIII Model UR-30 & 35, 1-1/2" - STATIC



Elkhart Brass Manufacturing Co., Inc.

1302 W. Beardsley Avenue Elkhart, IN 46514

Tel. +1 574-295-8330

Fax 574-293-9914

www.elkhartbrass.com

Email: eb.info@safefleet.net

98656000 Rev B

03-23