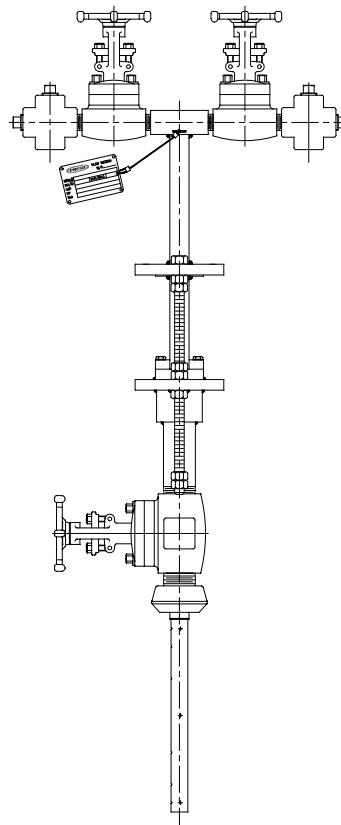




F L O W M E T E R I N G E Q U I P M E N T

Installation and Instruction Manual



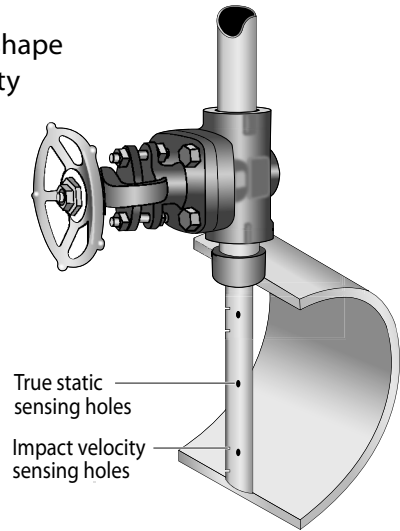
Series AHS Ellipse[®]
Threaded Hot Tap Steam



I. Introduction

Preso's patented elliptical design outperforms and provides greater accuracy than traditional differential pressure flow measurement devices. This differential pressure flow meter is designed with a series of ports facing the upstream velocity pressures, as well as flow sensing ports strategically located ahead of the trailing edge flow separation.

The multi-ported, self-averaging flow element consists of an elliptical shape with two independent flow sensing chambers. The impact velocity sensing holes (high pressure) are located along the leading edge and the true static sensing holes (low pressure) are on the exterior probe side. Model AHS comes with instrument shut-off valves with provisions to accept a transmitter or direct indicating meter.



II. Specifications

| | |
|-----------------------------|--|
| Applications: | Saturated and super heated steam |
| Pipe Sizes: | AHS; 2 to 14 inches (50 to 356 mm) AHS1; 14 to 24 inches (356 to 610 mm) |
| Pressure: | 800 PSI (5515 kPa) maximum Consult factory for higher pressures |
| Temperature: | 800 °F (426 °C) maximum Consult factory for higher temperatures |
| Accuracy: | ±0.75% of reading |
| Turndown Ratio: | 17:1 with no vacuum effect |
| Standard Components: | T-type head, 316 SS ½" FNPT connection CS 3000 lb. weld fitting - ASTM A105 316/316L SS Ellipse sensor Instrument valves (2 per sensor) - ½", CS 316 SS ID tag with wire CS packing chamber with EPDM packing gland CS isolation gate valve, NPT threaded CS threaded nuts and bolts CS nipples, schedule 40 |
| Reynolds Number: | Greater than 75,000 maintains most accurate flow measurements Less than 75,000 consult factory for estimated results |
| Resonance: | Less than 0.8 but greater than 1.2. If greater than 0.8, use double support. System shutdown is required when the double support option is used. Select larger diameter Ellipse to avoid double support. |

III. Pipe Orientation and Sensor Mounting

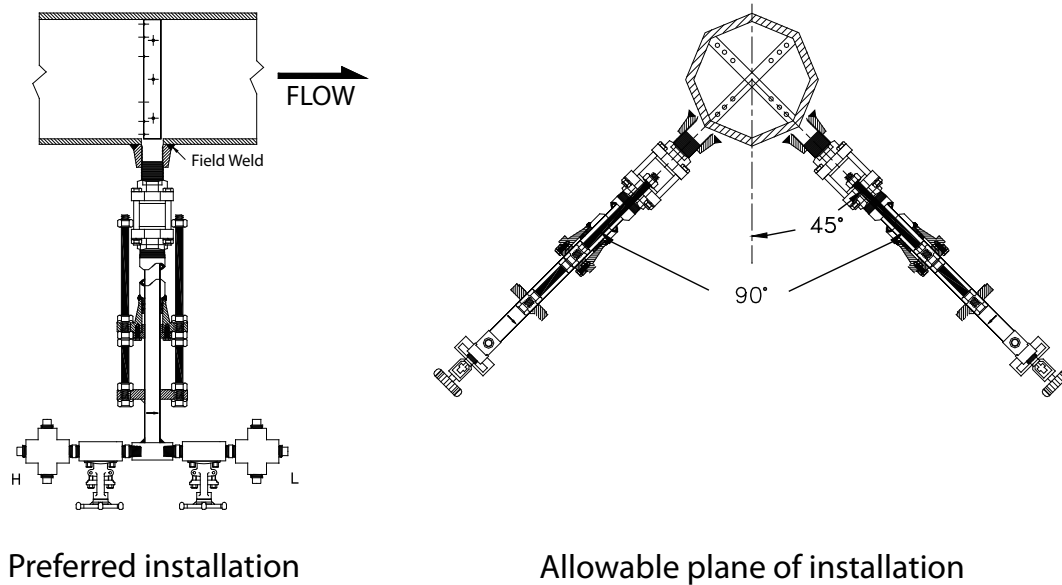


FIGURE 1 – Horizontal Pipe Installation

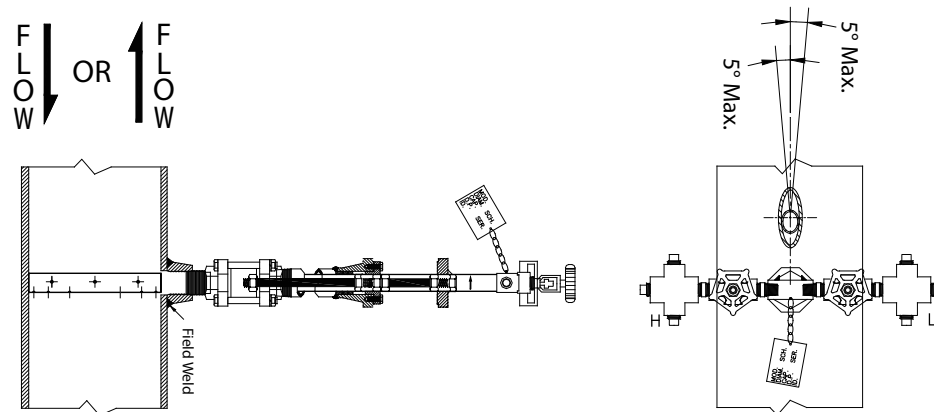


FIGURE 2 – Vertical Pipe Installation

NOTE: For general steam applications, instrument valves should be mounted at the same elevation to maintain equal condensation levels.

IV. Installation Instructions - Single Support

1. Choose the proper location to install the AHS Ellipse using AGA/ASME standards (or equivalent). Refer to the Location Instructions on page 6.
2. Grind the surface of the pipe where the AHS Ellipse is to be inserted to provide a clean area for welding.
3. Weld the supplied weld-o-let to the pipe using standard codes for your application ($\frac{1}{16}$ " weld gap recommended). Take care to protect the threads during the welding process.
4. Install the close nipple by threading it into the weld connector. Next, install the supplied 3-piece isolating ball valve.
5. Mount the high pressure drilling machine (e.g. Mueller D5) onto the ball valve. Open the ball valve. Drill a hole through the pipe wall according to **Table 1** on page 4.

NOTE: There is no need for a drilling machine if it is not a hot tap installation or if the system is not pressurized.

| MODEL / SENSOR | WELD CONNECTOR | DRILL BIT |
|----------------|----------------|-----------|
| AHS (7/8") | 1-1/4" | 1-1/8" |
| AHS1 (1-1/4") | 1-1/2" | 1-3/8" |

TABLE 1 – Single Support Drill Bit Size

- Having drilled through the pipe, withdraw the drill bit through the isolating valve. Once the drill bit has been withdrawn, CLOSE the valve and dismantle the drilling machine. Ensure that there is no leakage at the valve and close nipple connections. The valve is to remain completely closed until Step 9.
- Install the cage nipple, cage nipple assembly and packing gland with the threaded rods assembly by threading it into the isolating valve. Align the arrow on the sensor head with the direction of flow. See **Figure 3**.

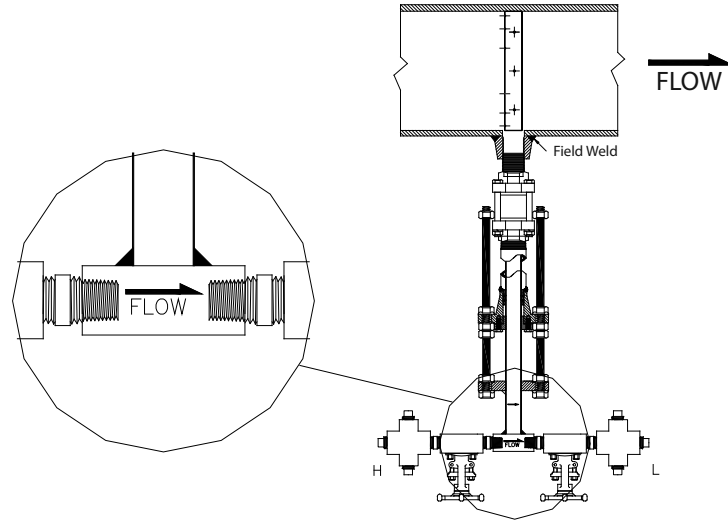


FIGURE 3 – Sensor Alignment

- Install the instrument valves at the AHS Ellipse head connections. Make sure that the valves are fully closed to prevent them from leaking upon start-up. Install the cross tees.
- Open the isolating ball valve. Insert the AHS Ellipse sensor into the pipe until it reaches the opposite pipe wall. This should be done by turning the threaded insertion rods clockwise using a wrench.
- Connect the instrument lines to the sensor head valves. In turn, connect these lines to a gage or transmitter.
- Verify that the instrument valves are FULLY CLOSED. Remove the 1/2" plugs from the top and side ports of the two (2) forged cross tees.
- Slowly pour water into the top ports of each forged cross tee until the system is full. Water will flow out of the side ports of both crosses.
- Reinstall the 1/2" plugs into the top and side ports. Ensure that they are secure. Then fully open the two (2) gate valves.
- Allow condensation levels to stabilize 1/2 hour before taking instrument reading.

V. Installation Instructions - Double Support

- Follow Steps 1 through 7 in Section IV. At 180° from and on the same plane as the previously drilled hole, grind the surface of the pipe to provide a clean area for welding. Drill a hole and deburr, especially on the inside of the pipe. The hole used for the double support should be sized according to **Table 2** on page 5.
- Weld the double support weld-o-let making sure that it is centered with the drilled hole (1/16" weld gap recommended).

| MODEL / SENSOR | WELD CONNECTOR | DRILL BIT |
|----------------|----------------|-----------|
| AHS (7/8") | 1-1/4" | 1-1/8" |
| AHS1 (1-1/4") | 1-1/2" | 1-3/8" |

TABLE 2 – Double Support Drill Bit Size

3. Install the AHS Ellipse sensor through the two holes. Make sure that the double support pin passes through the guide ring. See **Figure 4**.

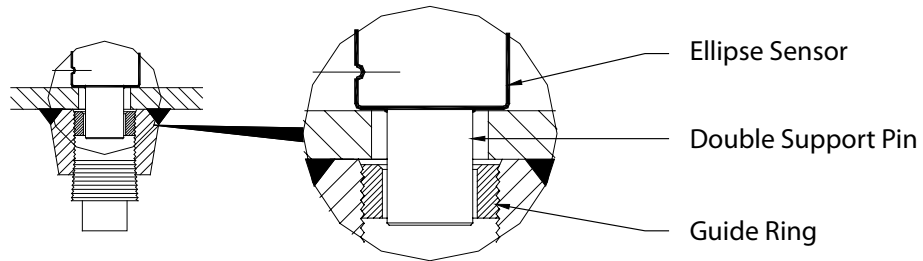


FIGURE 4 – Double Support Pin

4. While holding the AHS Ellipse in its fully inserted position, align the sensor head with the direction of flow as in Step 7, Section IV.
5. Ensure that the AHS Ellipse is in the correct orientation and spans the inside of the pipe. Tighten the compression nut. After tightening the compression nut manually, tighten it 1-1/4 turns more using a wrench.
6. Install the plug into the end of the double support weld-o-let. Tighten the plug to prevent leakage. Ensure that there is no leakage in the system.
7. Follow Steps 11 through 14 in Section IV.

VI. Typical Installation with Differential Pressure Transmitter

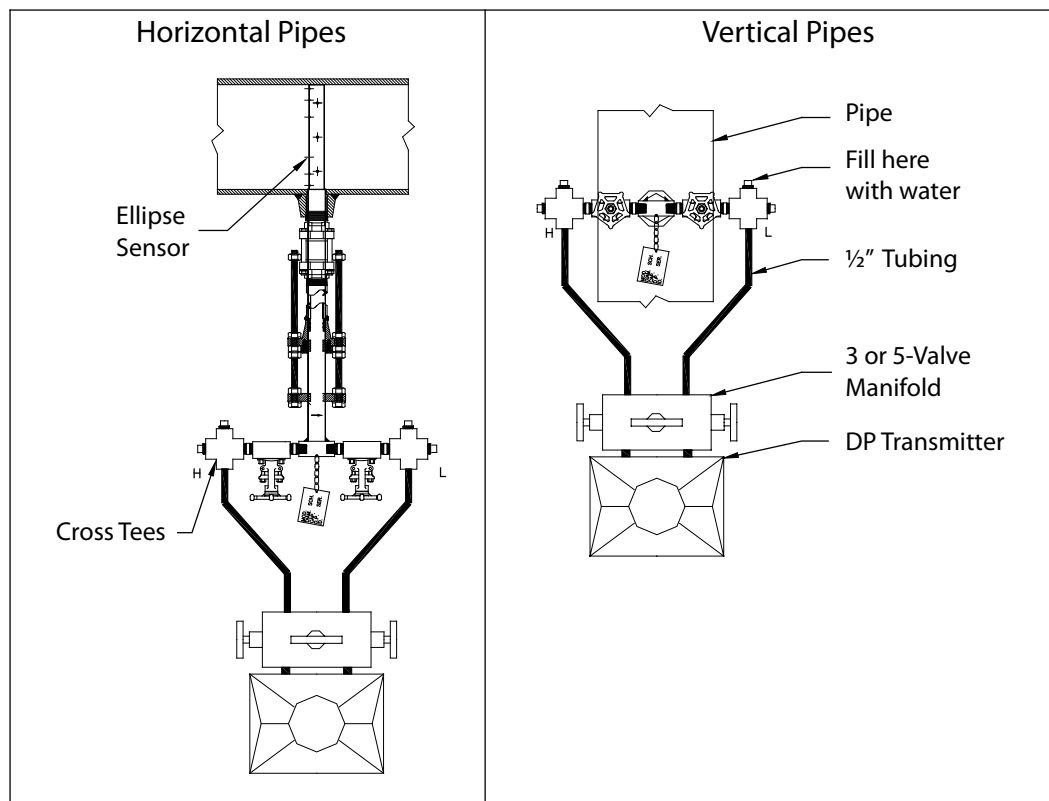
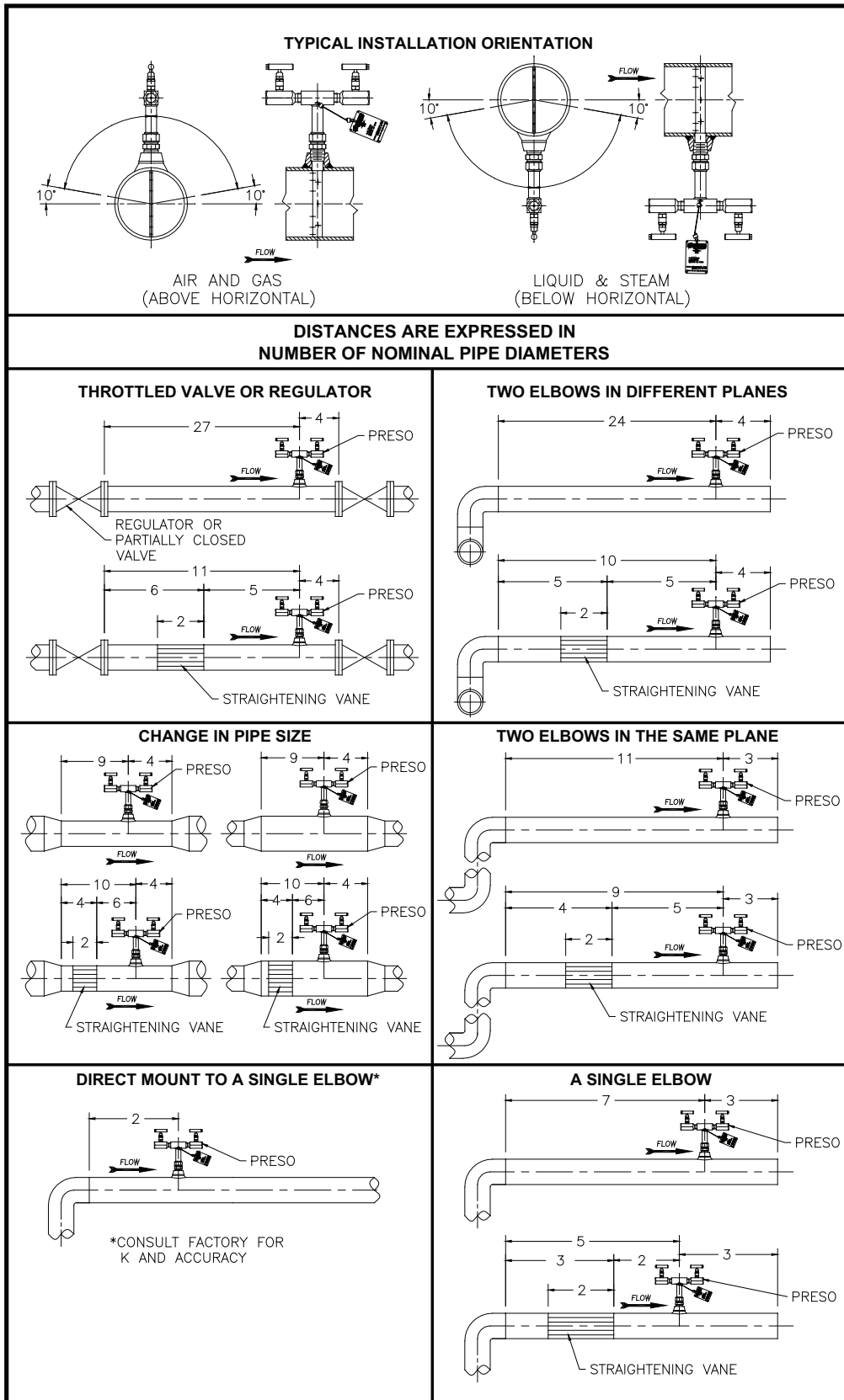


FIGURE 5 – Installation with Differential Pressure Transmitter

PRESO ELLIPSE LOCATION INSTRUCTIONS

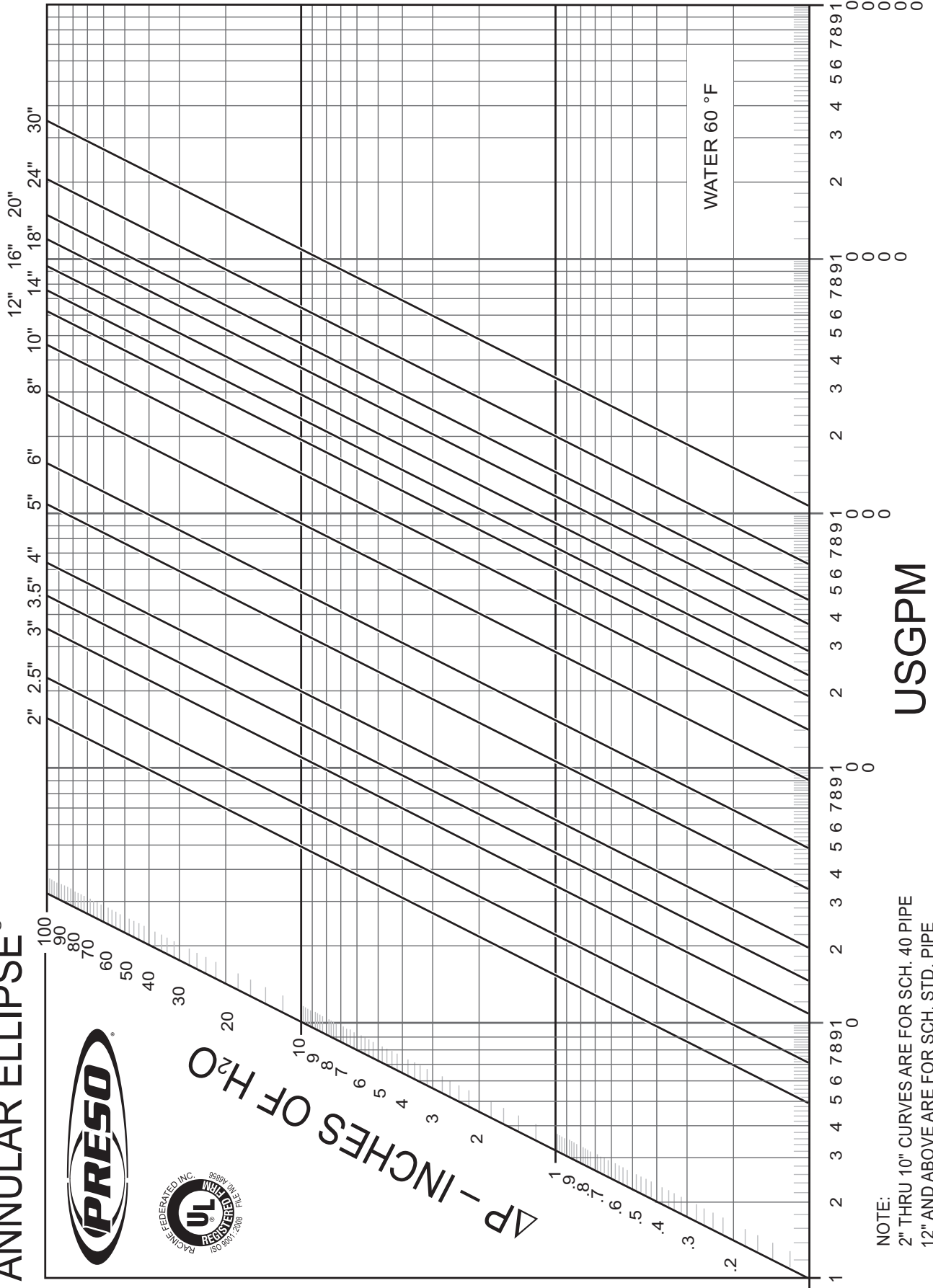
Straight pipe requirements: Accuracy is affected by the piping configurations due to the disturbances of the flow profile. A fully developed symmetrical flow profile is achieved with the minimum upstream and downstream recommended lengths.



ANNULAR ELLIPSE®



ΔP - INCHES OF H₂O



NOTE:
 2" THRU 10" CURVES ARE FOR SCH. 40 PIPE
 12" AND ABOVE ARE FOR SCH. STD. PIPE

USGPM



F L O W M E T E R I N G E Q U I P M E N T

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