

2. CALCULATIONS

2.1. Velocity V of the flow in the pipe:

$$Q1 := \frac{Q \text{ gpm} \times 3.7853}{60}$$

$$(V/\text{sec}) \quad Q1 = 2.587$$

$$(V/\text{sec}) \quad Q := \frac{Q1}{1000} \quad Q = 0.003$$

$$F := \frac{0.7854 \times D^2}{10^6}$$

$$(m^2) \quad F = 0.001$$

$$(m^2) \quad Dm := \frac{D}{10^3} \quad Dm = 0.038$$

$$V := \frac{Q}{F}$$

$$(m/\text{sec}) \quad V = 2.281$$

2.2. Reynolds Number:

$$Re := \frac{V \times Dm}{\nu}$$

$$Re = 4.561 \cdot 10^4$$

2.3. Friction factor: (cold drawn pipe)

$$\lambda := 0.3164 \times Re^{-0.25}$$

$$\lambda = 0.022$$

2.4. Pressure loss:

$$DPpa := \lambda \times \frac{L_{\text{eff}} \times \rho \times V^2}{Dm \times 2} \quad (\text{Pa})$$

$$DPpa = 3.664 \cdot 10^5 \quad (\text{Pa})$$

$$dP := \frac{DPpa}{10^5}$$

$$(\text{Convert Pa to bar})$$

$$dP = 3.664 \quad (\text{bar - loss})$$

$$dPpsi := dP \times 14.51$$

$$(\text{Convert Bar to psi})$$

ESTIMATED

$$dPpsi = 53.167 \quad (\text{psi - loss})$$

Scientific Units

Pa = Pascals

Q = Mass Flow

Cubic Meters

d = delta

difference

Dm = Diameter Meters



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