

## 2. CALCULATIONS

2.1. Velocity  $V$  of the flow in the pipe:

$$Q1 := \frac{Q \text{ gpm} \times 3.7853}{60} \quad (\text{l/sec}) \quad Q1 = 2.587$$

$$F := \frac{0.7854 \times D^2}{10^6} \quad (\text{m}^2) \quad F = 0.001$$

$$V := \frac{Q}{F} \quad (\text{m/sec}) \quad V = 2.281$$

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

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

2.2. Reynolds Number:

$$Re := \frac{V \times Dm}{\nu} \quad Re = 4.561 \cdot 10^4$$

2.3. Friction factor: (cold drawn pipe)

$$\lambda := 0.3164 \times Re^{-0.25} \quad \lambda = 0.022$$

2.4. Pressure loss:

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

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

$$dP := \frac{DP_{pa}}{10^5} \quad (\text{Convert Pa to bar})$$

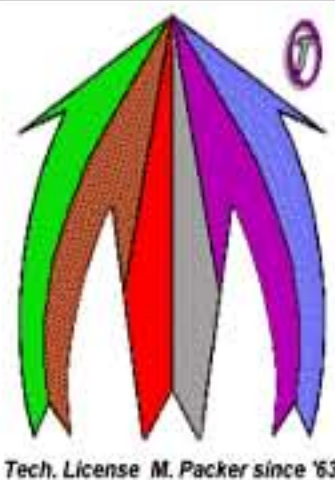
$$dP = 3.664 \quad (\text{bar - loss})$$

$$dP_{psi} := dP \times 14.51 \quad (\text{Convert Bar to psi})$$

**ESTIMATED**  
 $dP_{psi} = 53.167 \quad (\text{psi - loss})$

**Scientific Units**  
 Pa = Pascals  
 Q = Mass Flow  
 Cubic Meters  
 d = delta  
 difference  
 Dm = Diameter Meters

Flow friction Pt2 continued LDI P44



**Liquid Dynamics International Inc.**

*Analysis, Diagnostics, Prediction by Software*

Phone USA --910-270-2737 Color Fax --910-270-0320 UK (for EC) --44-161-442-6222 Color Fax --44-161-443-1486  
 Box 506 Hampstead NC 28443 www.liquid-dynamics.com Box 47, Stockport, SK3-0LH, UK



A Subsidiary of Liquid Dynamics International Ltd.