

10.20/

$$h_L = K \times \left(\frac{V^2}{2g} \right)$$

$$Q = A \times V$$

$$A = \frac{\pi}{4} \times D^2$$

DN 125 Schedule 80 to a DN 50 Schedule 80 pipe
flow rate of 500 L/min

DN 125 = 141.3 mm Outside diameter
9.5 mm wall thickness

DN 50 = 60.3 mm Outside diameter
5.54 mm wall thickness

$$D_1 = D_{OD} - 2t$$

$$D_1 = 141.3 - 2(9.5) = 122.3 \text{ mm} = 0.1223$$

$$D_2 = 60.3 - 2(5.54) = 49.22 \text{ mm} = 0.04922$$

$$\frac{D_1}{D_2} = \frac{0.1223}{0.04922} = 2.485$$

$$A_2 = \frac{\pi}{4} \times D^2 = \frac{\pi}{4} \times (0.04922 \text{ m})^2 = 19.035 \times 10^{-4} \text{ m}^2$$

$$Q = A \times V$$

$$V = \frac{Q}{A} = \frac{500 \text{ L/min}}{19.035 \times 10^{-4} \text{ m}^2} \times \frac{1 \text{ m}^3/\text{s}}{60,000 \text{ L/min}} = 4.378 \text{ m/s}$$

$$h_L = K \times \left(\frac{V^2}{2g} \right)$$

$$h_L = (0.39) \times \left(\frac{4.378^2}{2 \times 9.81} \right) = \boxed{0.381 \text{ m}}$$