

The air pressure in a duct is measured by an inclined manometer ($\alpha = 35^\circ$). For a given vertical level difference, the gage pressure in the duct and the length of the differential fluid column are to be determined.

$$\rho = 0.81 \text{ kg/L}$$

$$\rho = 0.81 \text{ kg/L} = 810 \text{ kg/m}^3$$

$$p_{Air} = p_{atm} + \rho g h$$

$$p_{Air,gage} = p_{Air} - p_{atm} = \rho g h = 810 \times 9.81 \times 0.08 = 636 \text{ Pa}$$

$$L = \frac{h}{\sin \alpha} = \frac{8}{\sin 35^\circ} = 13.9 \text{ cm}$$

