

DETERMINATION OF FLOW RATE BY PITOT TUBE

$$\dot{m} = a \frac{\rho D^2}{4} \sqrt{2 \rho \Delta p_{eff}}$$

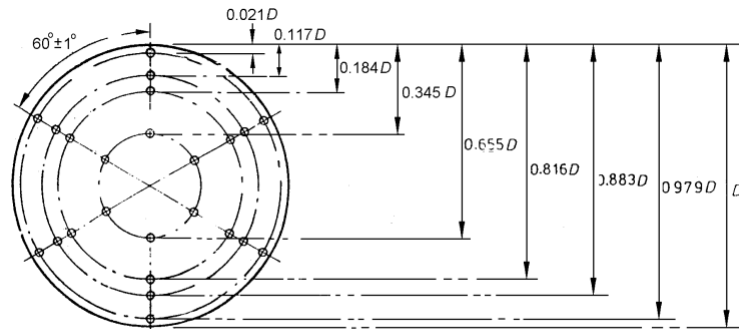
or

$$V = \frac{\dot{m}}{\rho A} = a \sqrt{\frac{2 \rho \Delta p_{eff}}{\rho}}$$

Where: Δp_{eff} = Effective differential pressure of the section traversed is determined from the average pressure from twenty four points across the tube section as follow:

$$\text{Mass flow } \dot{m} = a \frac{\rho D_x^2}{4} \sqrt{2 r_x \Delta p_{eff}} \quad ; \quad \text{Average velocity } V_x = \frac{\dot{m}}{r_x A_x} = a \sqrt{\frac{2 \Delta p_{eff}}{r_x}}$$

$$\text{Effective dynamic pressure } p_{dyn,x} = \frac{\dot{m}^2}{2 r_x A_x^2} = a^2 \Delta p_{eff}$$



LOCATION OF POSITIONS FOR TRAVERSE MEASUREMENT IN STANDARDIZED AIRWAYS

The value of α is depend on Reynolds number as in the table below.

Re_D	3×10^4	10^5	3×10^5	10^6
α	0.986	0.988	0.990	0.991