Measurement of Air Volume and Static Pressure

Determination of the air performance curves is obtained by using the double chamber method based on AMCA standard. The difference between the pressures before and after the nozzle (differential pressure Pn) is measured to obtain the air flow at the nozzle and the different pressures between those in the two chambers (static pressure Ps). The air flow is calculated from the differential pressure by using equation (A). The auxiliary blower cancels out the aerodynamic resistance.

$Q = 60\,AV$ .... (A)
Where
Q : Air flow rate (m^3/min)
A : Nozzle sectional area $=F/4\ D^2$ (m^2)
V : Average flow velocity from nozzle

$$= \sqrt{2\ \frac{Pn}{r}}\ (m/s)$$

r : Specific gravity (kg/m^3) of air (r=1.2kg/m^3 at 20°C, 1 atm)
g : Gravitational acceleration = 9.8m/S^2
Pn : Differential Pressure (mm H_2O)
Ps : Static pressure (mm H_2O)

Maximum air flow: When opening the nozzle and absorbing the air using the auxiliary blower to make the static pressure zero (Ps=0), the differential pressure (Pn) between chamber A and chamber B will be at it's maximum. The air flow obtained by applying the differential pressure (Pn) to the above equation can be called the maximum air flow.

Maximum static pressure: As shown in the figure, when closing the nozzle, the pressure in the chamber A will be at it's maximum. This differential pressure (Ps) between the air pressure and the pressure in the chamber A can be called the maximum static pressure.