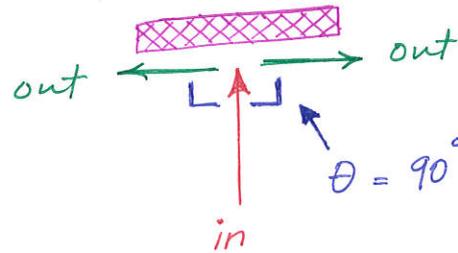


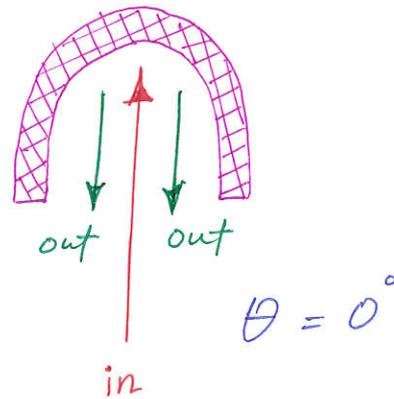
⊛ Exp. # 3 :- Impact of Jet (I)

⊛ Plate Types :-

1- Flat plate : ($\theta = 90^\circ$)



2- Semispherical plate : ($\theta = 0^\circ$)



* Calculations :-

- $F_y = Q_m v (\cos \theta + 1)$

- $W = F_y \rightarrow$ at static Equilibrium

- $Q_m = \rho Q_t$

- $Q_t = Av = \frac{v}{t}$

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

- $\text{slope} = \rho A (\cos \theta + 1) = \frac{F_y}{v^2}$ (Theo.)

$\rightarrow F_y = \rho A v^2 (\cos \theta + 1)$

* Where :-

F_y : Force Exerted by deflector on Fluid (Reaction) (N)

Q_m : Mass Flow Rate (Kg/sec.)

Q_t : Volume Flow Rate (m^3 /sec.)

v : Flow velocity (m/sec)

θ : Deflection Angle

D : Nozzle Diameter (m)

A : Nozzle Cross-sectional Area

* Results: (Tables)

Diameter of Nozzle, D (m)	Area of Nozzle, A (m ²)	Deflector Type, θ (°)	Collected Volume, V (m ³)	Time to Collect, t (sec.)	Mass Applied, W (kg)	Volume Flow Rate, Q (m ³ /sec.)	Flow Velocity, v (m/sec.)	Squared Flow Velocity, v ² (m/sec.)	Reaction Force, F _y (N)	Theo. Slope (%)	Exp. Slope (%)	
		Flat Plate ($\theta=90^\circ$)										
		Semi-spherical Plate ($\theta=0^\circ$)										

* Results: (Figures)

Here you should:

- Draw two curves:
 - 1- Reaction Force (F_y) **against** Squared Flow Velocity (v²) for Flat Plate.
 - 2- Reaction Force (F_y) **against** Squared Flow Velocity (v²) for Semispherical Plate.
- Determine the experimental slope of the two curves (Two Plates) and compare between them.
- Compare between Theo. and Exp. slopes for each plate.