

Reynolds Number.

[DEPTH OF BIOLOGY]

→ Dimensionless Quantity.

→ Used to determine the type of flow pattern while flowing through a pipe.

Laminar
Turbulent

★ Reynold Number is defined as ratio of Initial force & Viscous force.

$$\left[\text{Reynolds Number} = \frac{\text{Initial force}}{\text{Viscous force}} \right]$$

[DEPTH OF BIOLOGY]

Reynold Number

$$Re = \frac{\rho V D}{\mu}$$

Viscosity of fluid.

ρ = density of fluid.

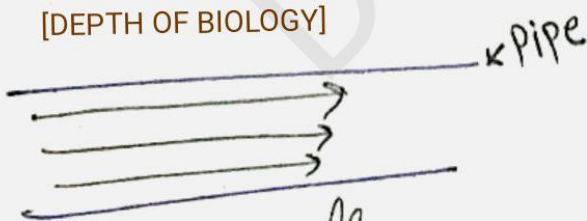
V = Velocity of flow.

D = Diameter of pipe

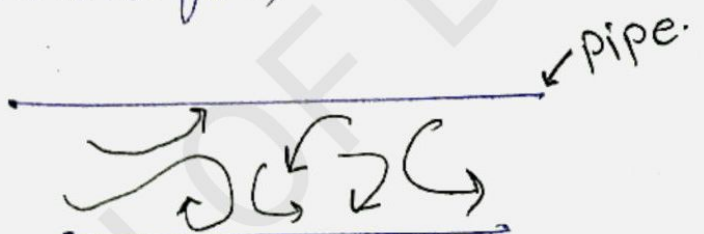
⇒ Reynold Number > 2000 [Turbulent flow].

< 2000 (Laminar flow)

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Laminar flow



Turbulent flow.

Laminar flow $\rightarrow$ Type of flow in which fluid travel smoothly in regular path.

Turbulent flow $\rightarrow$ Type of flow in which fluid NOT travel smoothly & follow irregular path with lot of mixing.

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★ The Reynold Number is Named after the British Physicist Osborne Reynold.

$\rightarrow$ He observe that the type of flow can transition from laminar to turbulent quite suddenly.

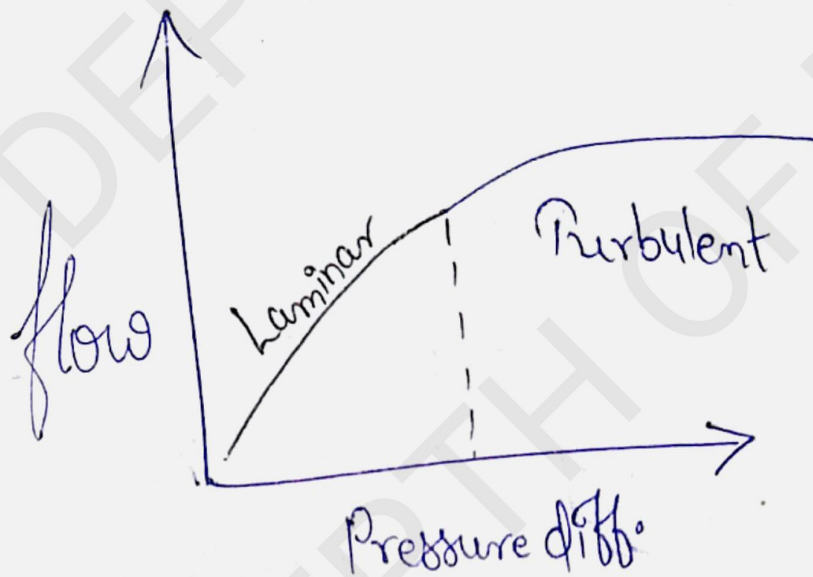
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Importance

of Reynold Number

- (a) Play Important role in study of fluid mechanics
- (b) Play Important role in the calculation of the friction factor.
- (c) Determine the flow of Pattern $\left\{ \begin{array}{l} \text{Turbulent} \\ \text{Laminar} \end{array} \right.$
- (d) Important part in the testing of Wind Lift on Aircraft.

[DEPTH OF BIOLOGY]



eg → Burning of candle

Turbulent []
Laminar []

Reynold Number
used to predict
where this transition
takes place.

The plume from this
Candle flame goes
from Laminar to
Turbulent.