

# **SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES**

*Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai*

*Approved by Pharmacy Council of India, New Delhi.*

**Coimbatore -641035**



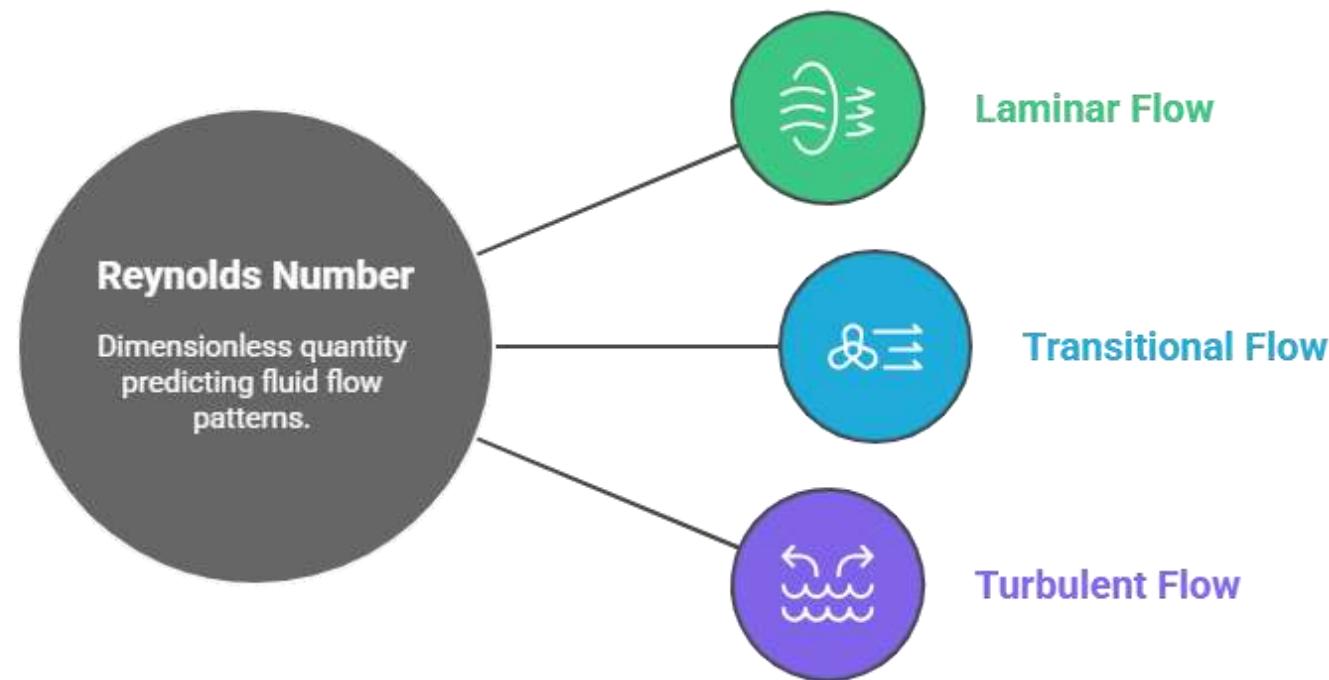
**COURSE NAME : PHARMACEUTICAL ENGINEERING (BP404 T)**

**III SEM / II YEAR**

**TOPIC 1 : FLOW OF FLUIDS**

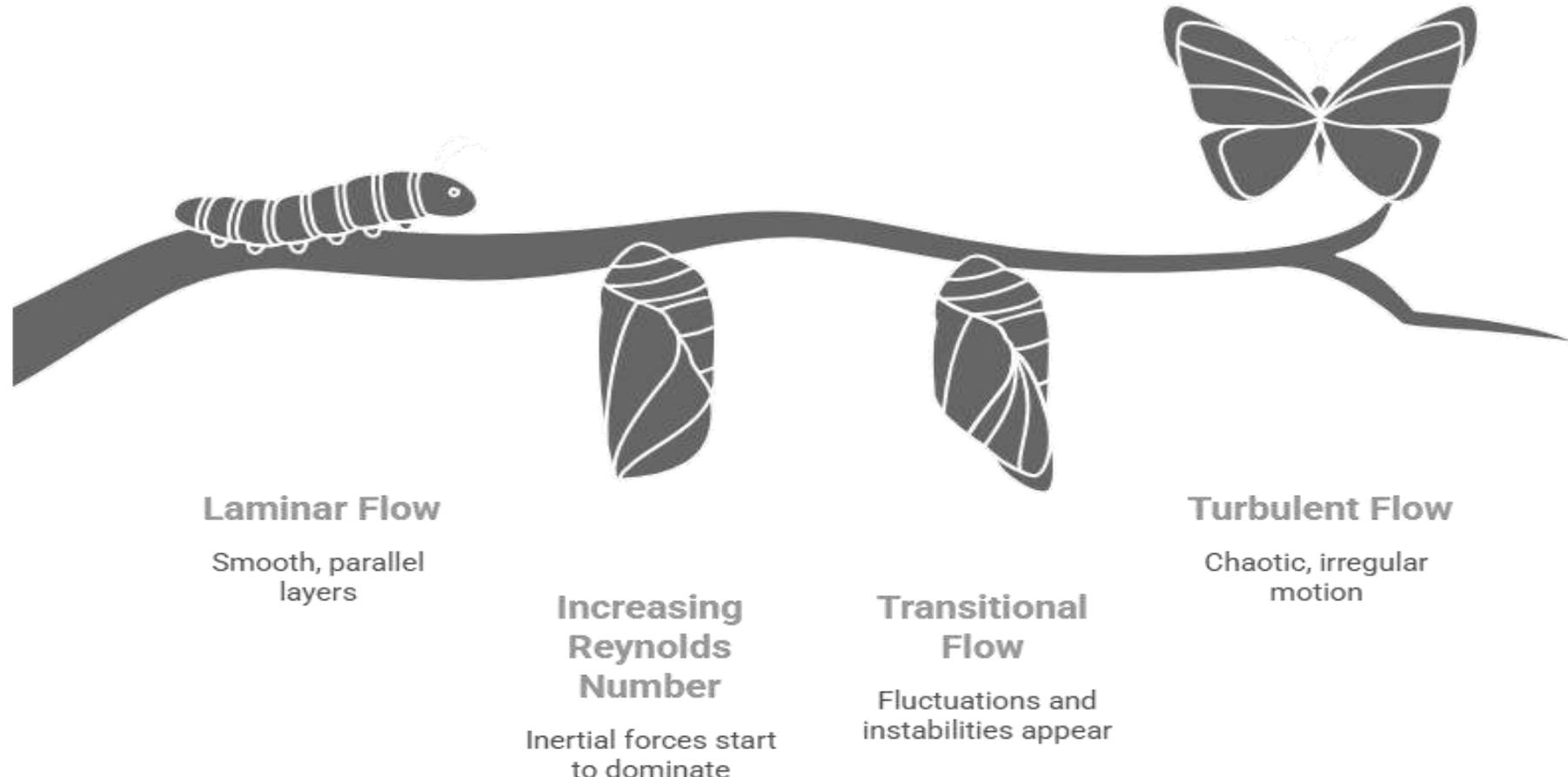
**SUBTOPIC:BERNOULLIS THEORM AND FLUID FLOW APPARATUS**

## Unveiling Fluid Flow Patterns with Reynolds Number



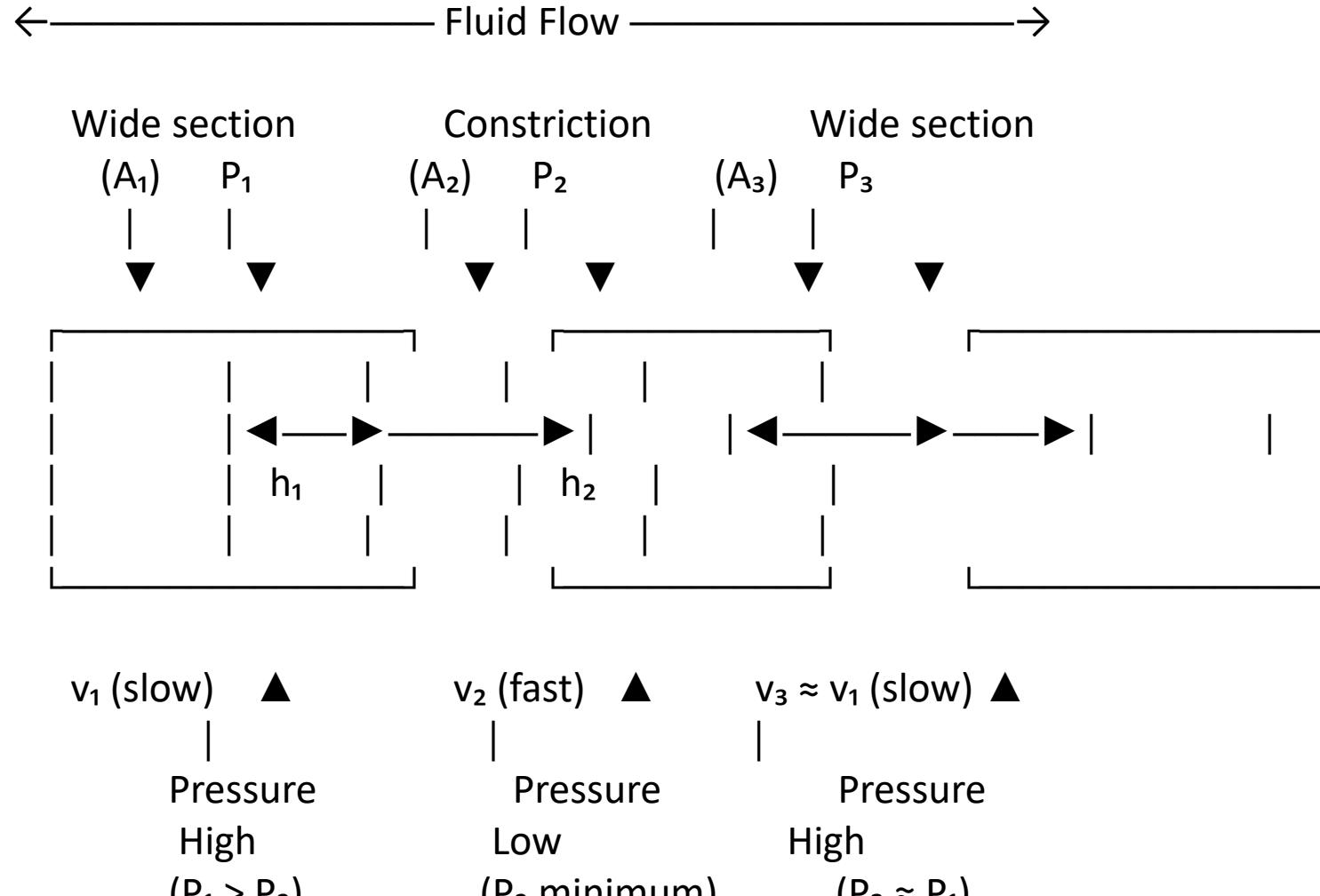
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## Fluid Flow Regimes



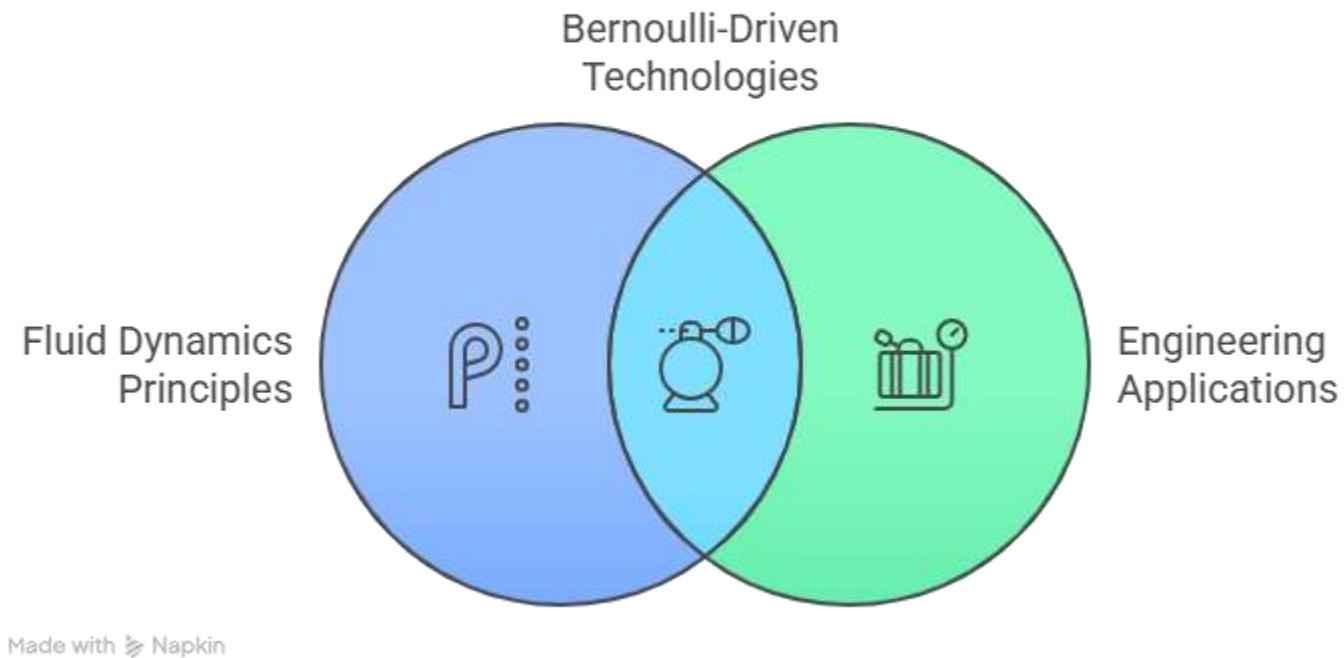
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## BERNOULLIS THEOREM

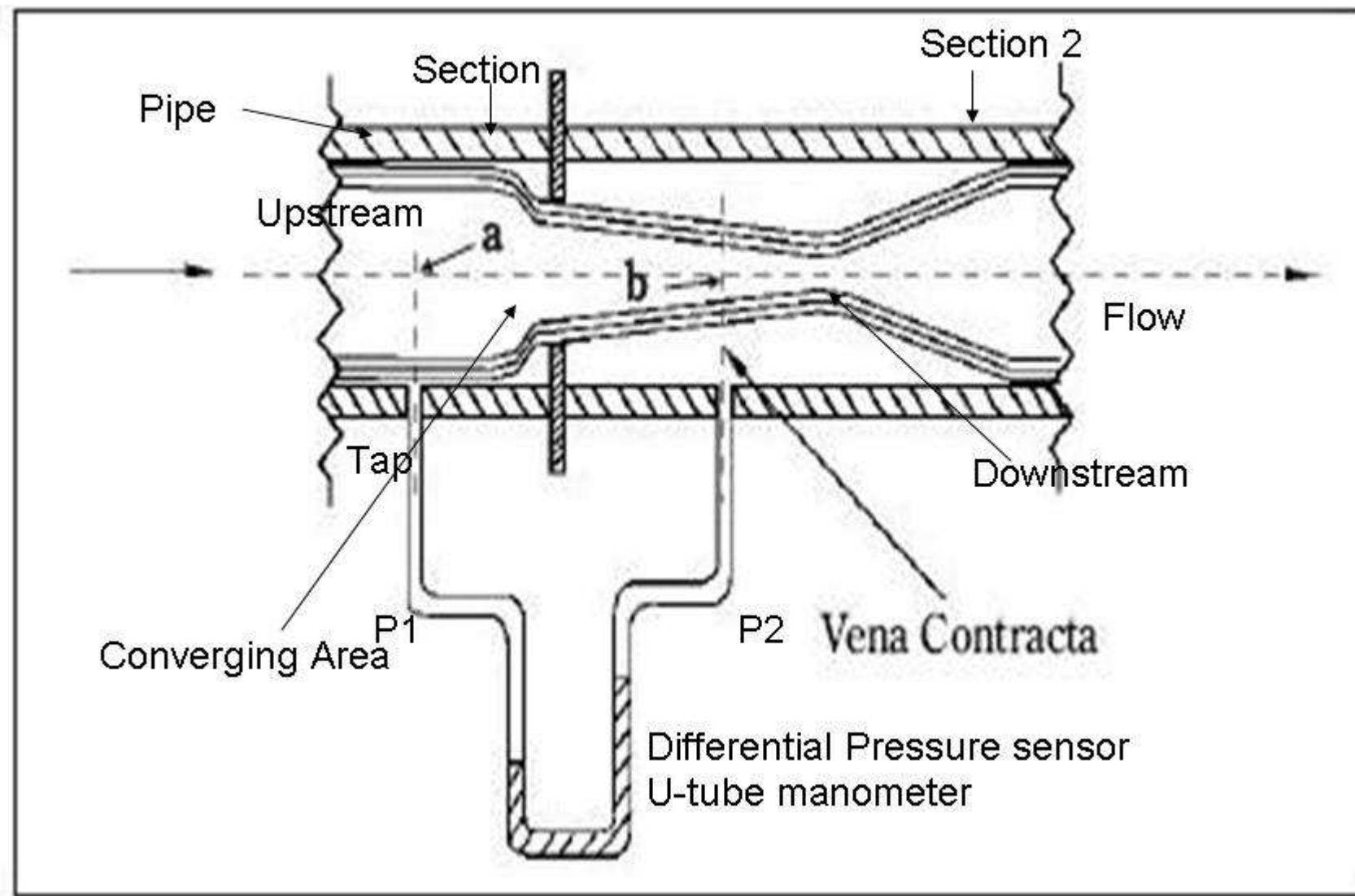


Vertical tubes show static pressure head (height of liquid column  $\propto$  pressure)

## Applications of Bernoulli's Theorem



## Orifice Flow Meter



## Orifice Meter Flow Measurement

### Unmeasured Flow

Unknown fluid flow rate



### Constriction

Orifice plate creates pressure drop

### Pressure Measurement

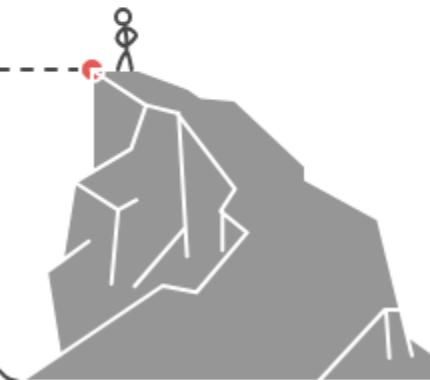
Measure pressure difference across orifice

### Flow Calculation

Calculate flow rate using equation

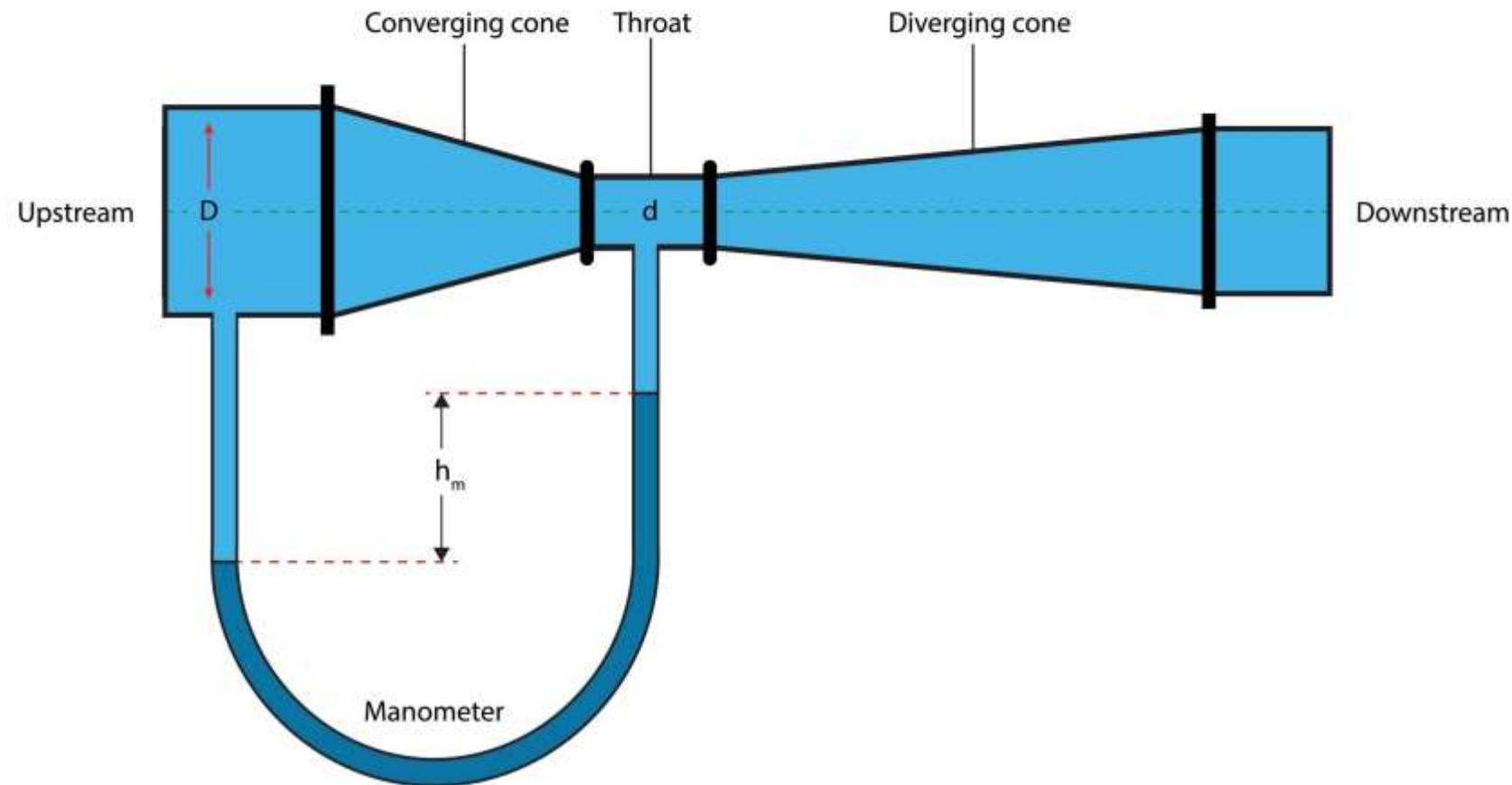
### Measured Flow

Known fluid flow rate

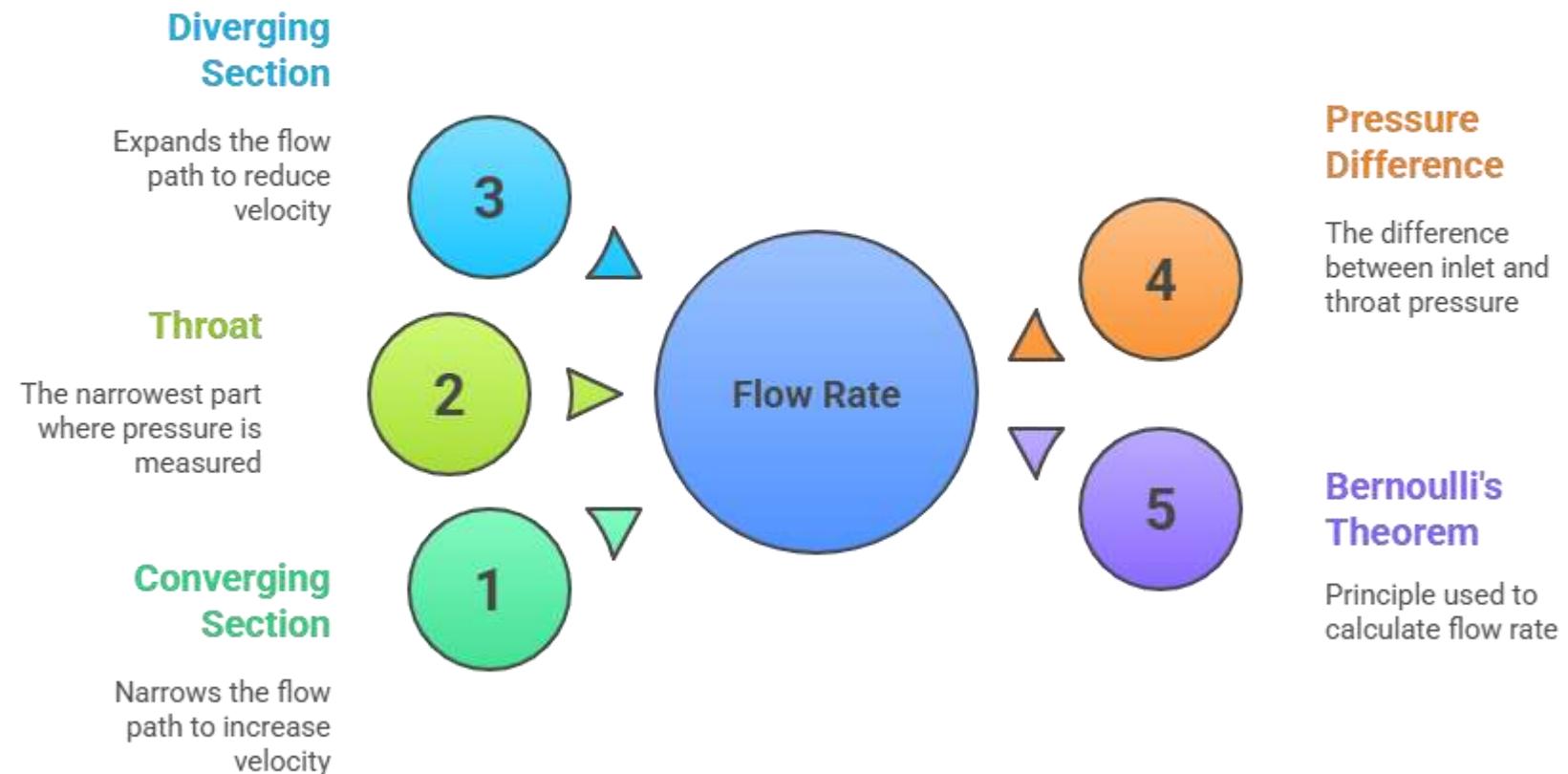


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# VENTURI METER

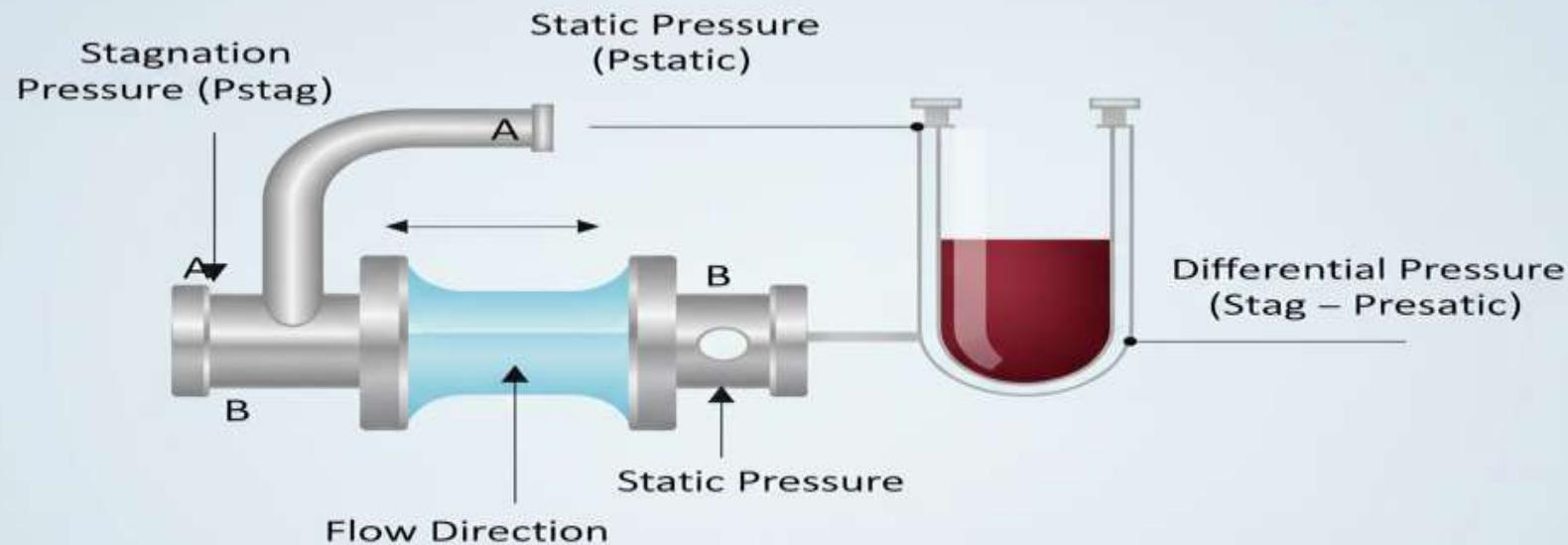


## Venturi Meter Components and Function



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# PITOTS TUBE



$$v = \sqrt{2 \frac{\text{Fluid Density} (\rho)}{(P_{\text{stag}} - P_{\text{static}}) \rho}}$$



How can I determine the fluid velocity using a Pitot tube?

By measuring both the stagnation pressure and the static pressure, you can use the formula  $v = \sqrt{2 * (P_{stagnation} - P_{static}) / \rho}$ .

Where are Pitot tubes commonly used?

They are commonly used to measure the velocity of air in aircraft and wind tunnels.

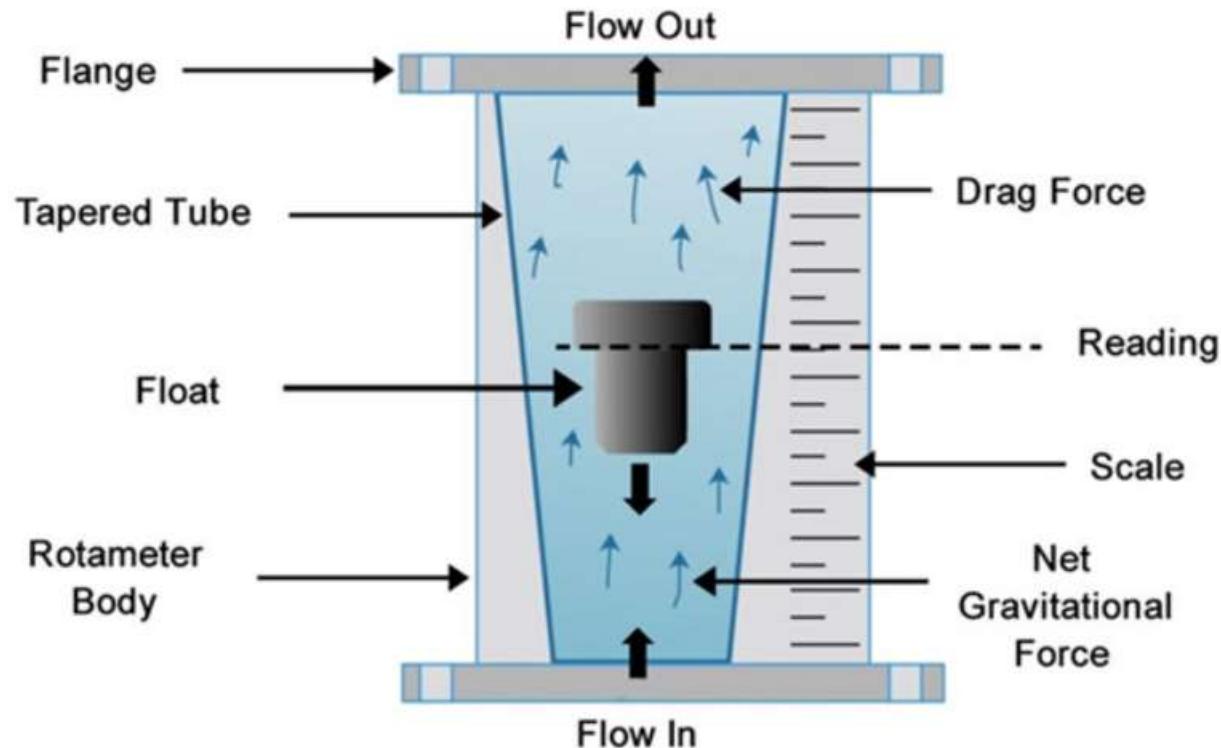


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## ROTAMETER



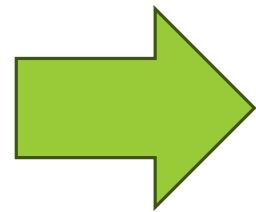
## ROTAMETER



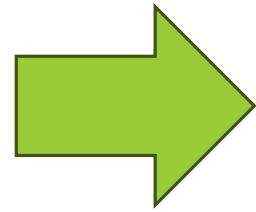
1. Which of the following flow meters operates on the principle of a **variable-area** instead of a differential pressure measurement?



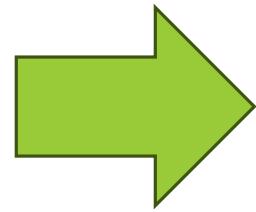
Options



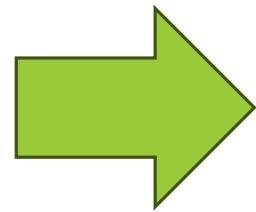
Venturi meter



Orifice Meter



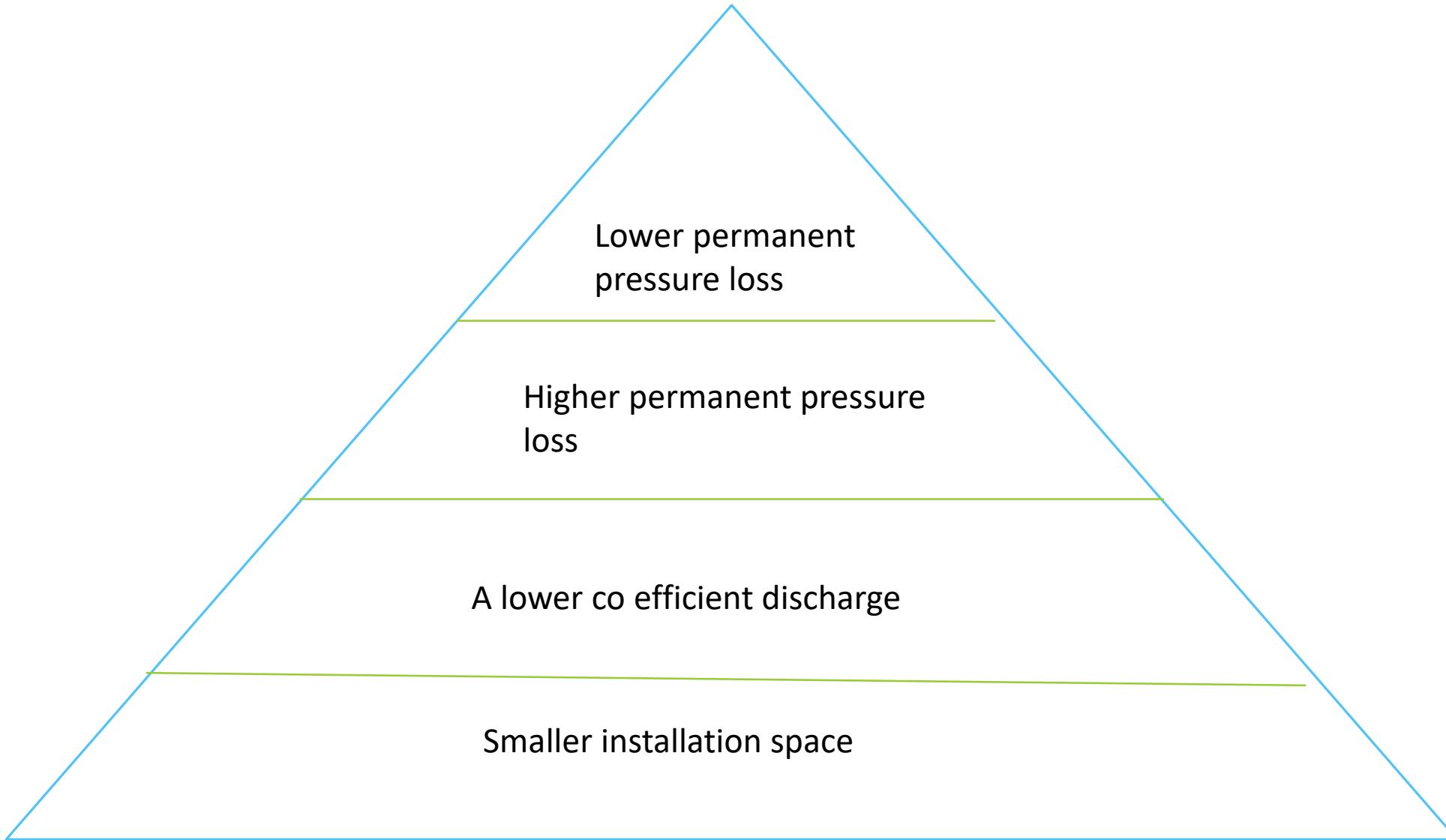
Rotameter



Pitot Tube

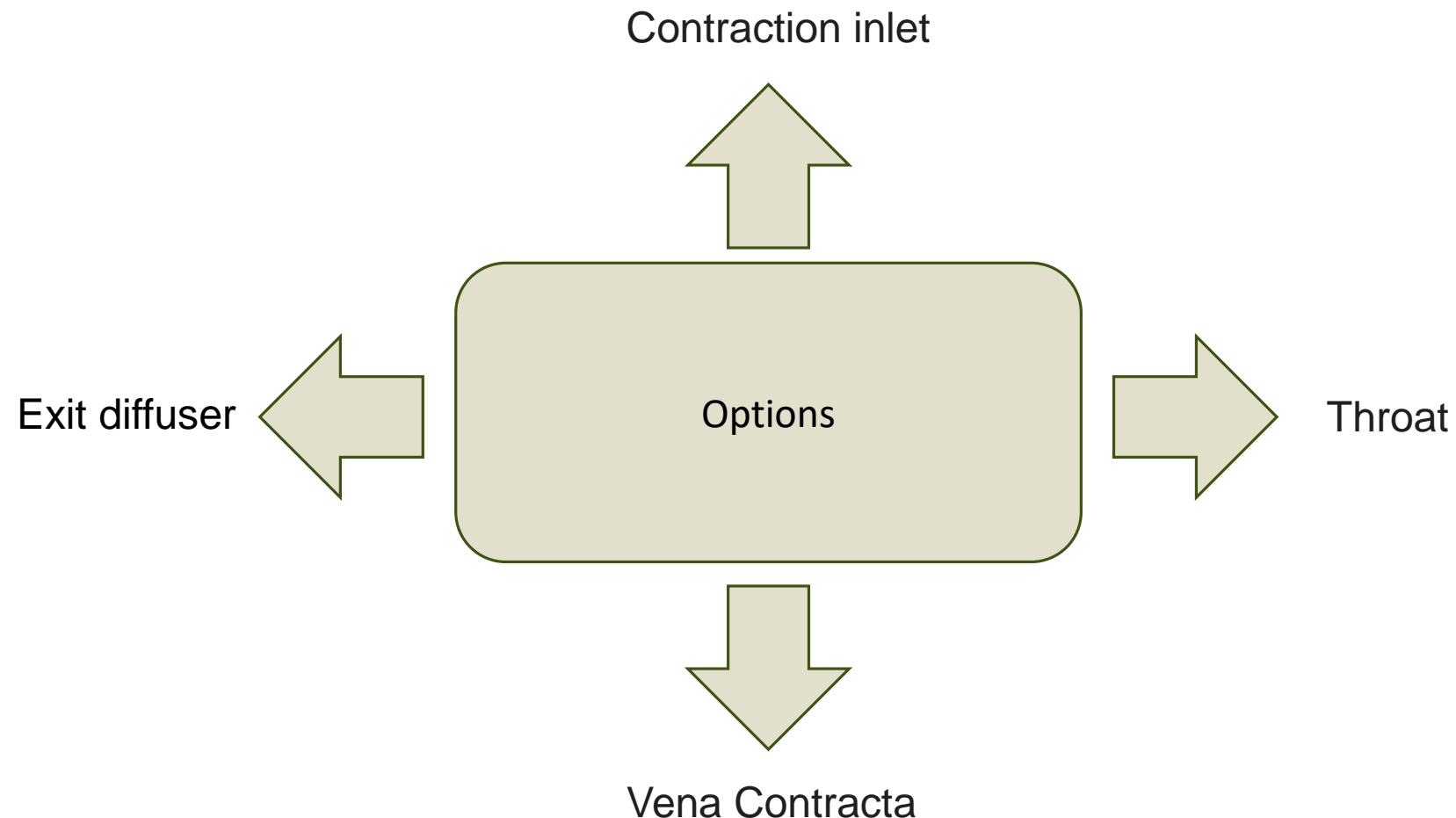
2. Compared to an Orifice Meter, a Venturimeter generally offers:





3. In an Orifice Meter, the point immediately downstream of the orifice plate where the jet area is minimum and the fluid velocity is maximum is known as the:





## REFERENCES

1. Yie W. Chien: Novel Drug Delivery Systems, Second Edition, Marcel Dekker, Inc, 1992 Pg no.816.
2. Joseph R. Robinson: Sustained and Controlled Release Drug Delivery Systems, First edition, Volume 6, Marcel Dekker, Inc, 1986, pg.618.
3. <https://www.sciencedirect.com/journal/journal-of-controlled-release>
4. <https://www.tandfonline.com/doi/full/10.1080/10837450.2018.1534376>
5. <https://www.scribd.com/document/668313752/Controlled-and-Novel-Drug-Delivery-by-N-K-Jain-1st-Editn-Reprint>



# THANK YOU