

Aim ~~Goal~~

To study the effect of viscosity on the rate of filtration.

Reference:-

Requirements:-

- (a) Apparatus :- Beaker, filter paper, measuring cylinder.
- (b) ~~Glass~~ Chemical :- Glycerine,  $\text{CaCO}_3$ , distilled water.

Theory:-

Principle :- Filtration is a process where solid particle suspension are separated from liquid or gas employing porous media which retain a solid particle but allow the fluid to pass through. Volume of filtration obtained through the filter paper per unit time is called rate of filtration.

eg:-  $\boxed{\frac{dv}{dt} = KA \cdot \Delta P / \mu L}$  - Darcy's law.

## Observation:

S No.	Sample	Time taken	Volume of filtration	Rate of Fil.
1.	5% $\text{CaCO}_3$	342 sec	45 ml	0.13 ml/sec
2.	5% $\text{CaCO}_3$ + Glycerine	679 sec	45 ml	0.06 ml/sec

## Calculation:

$$\text{Rate of filtration} = \frac{\text{Vol. of filtrate}}{\text{Time taken}}$$

$$(i) \text{ 5\% } \text{CaCO}_3 = \frac{45 \text{ ml}}{342 \text{ sec}} = 0.13 \text{ ml/sec}$$

$$(ii) \text{ 5\% } \text{CaCO}_3 + \text{Glycerine} = \frac{45 \text{ ml}}{679 \text{ sec}} = 0.06 \text{ ml/sec}$$



where,

$A$  = Area of filter,

$V$  = Volume of filter,

$K$  = Constant

$\Delta P$  = Pressure drop across the filter media and cake,

$\mu$  = Viscosity of filtrate,

$L$  = Thickness of cake,

$t$  = Time of filtration.

### Procedure:

- (i) Take all glasswares and clean it and dry it.
- (ii) Preparation of 5%  $\text{CaCO}_3$  solution:-  
→ (a) Take 2.5 gm of  $\text{CaCO}_3$  and dissolve into 50 ml of distilled water then prepare 5% of solution of  $\text{CaCO}_3$ .
- (iii) Preparation of mixture of glycerine water and calcium carbonate.  
(a) Take 2.5 gm of  $\text{CaCO}_3$  and dissolve it into 40 ml of distilled water. Now add 10 ml of glycerine in this mixture.
- (iv) After preparation of solution filter with filter paper and note the time for filtration to calculate the rate of filtration and compare them.

Teacher's Signature \_\_\_\_\_



Result:-

The study of effect of rate of filtration was successfully performed in the laboratory.