



## Shroff S.R. Rotary Institute of Chemical Technology



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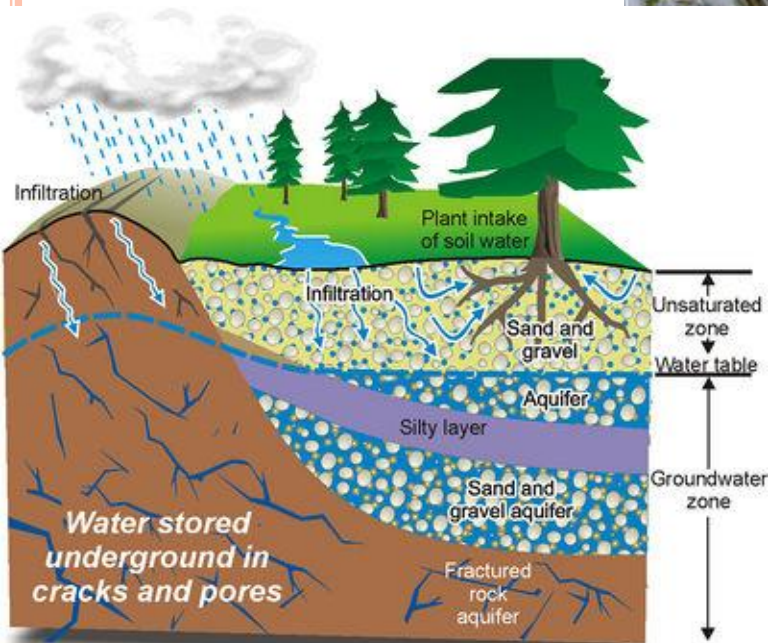
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# Filtration

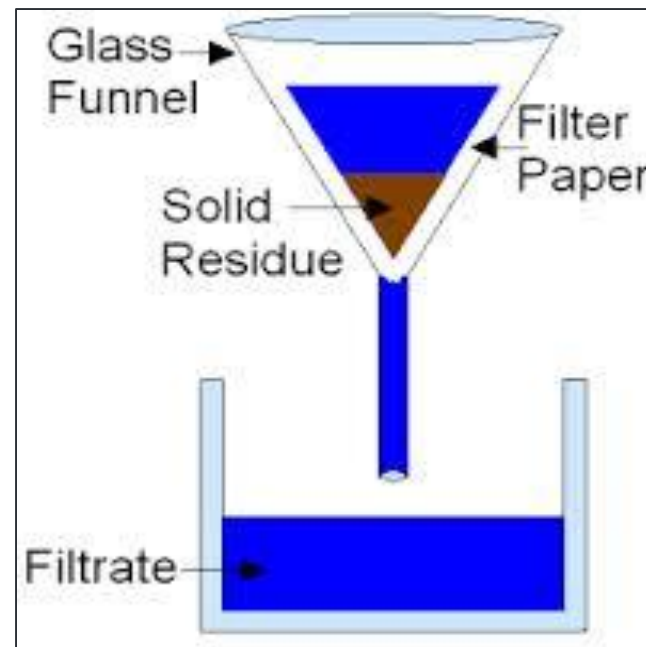
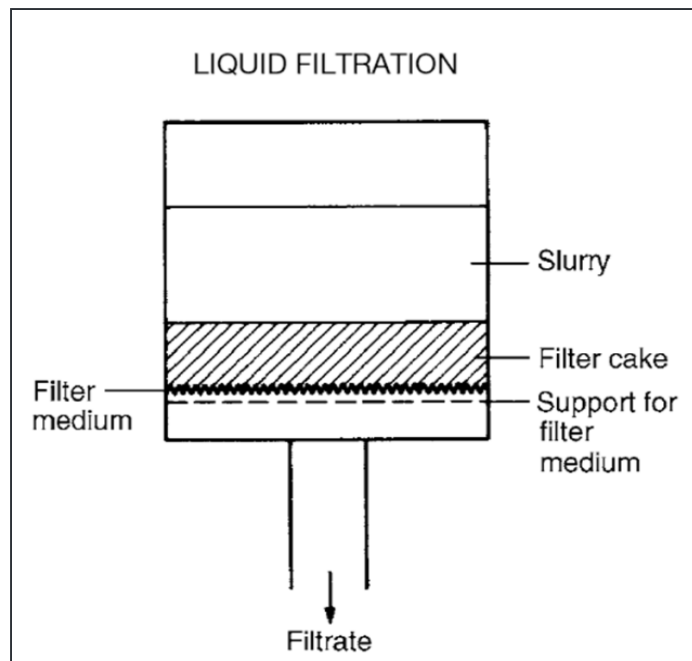
# FILTRATION

- Filtration is the separation of solid from a suspension in liquid with the help of porous medium that retains the solid and allows the fluid to pass.



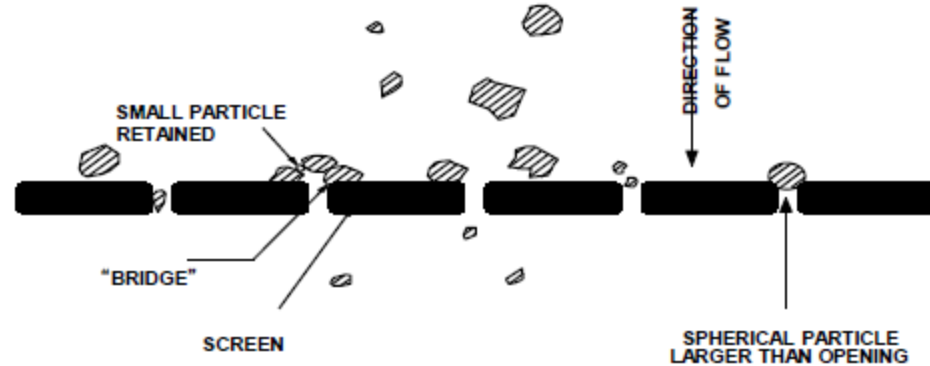
## Important terms in filtration:

- **Feed or Slurry:** The suspension of solid and liquid to be filtered.
- **Filter Medium:** The porous medium used to retain the solids.
- **Filter Cake:** The accumulated solids on the filter medium.
- **Filtrate:** The clear liquid passing through the filter.

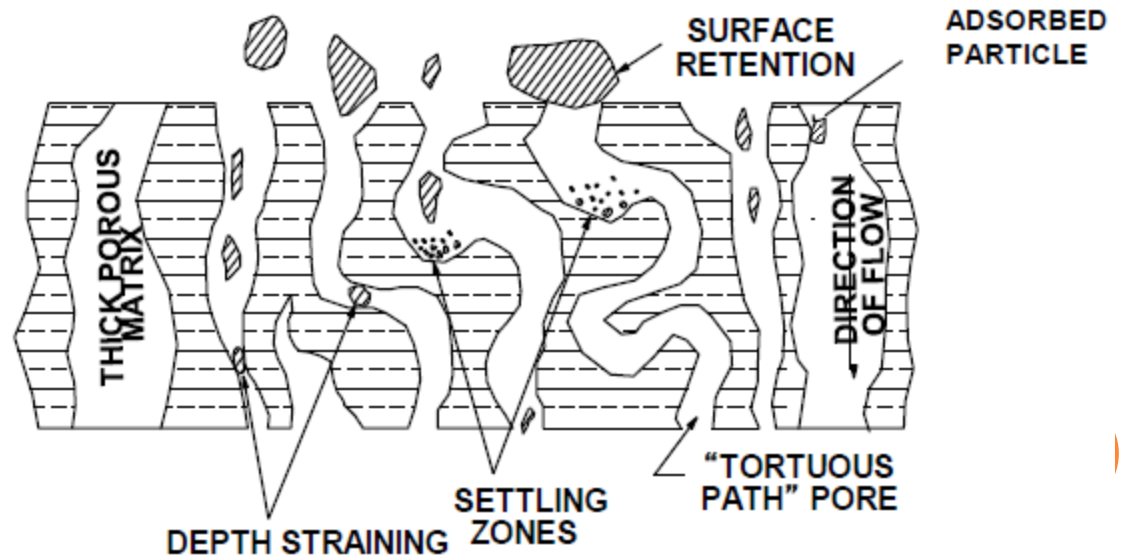


# MECHANISM OF FILTRATION

- Cake filtration



- Deep bed filtration

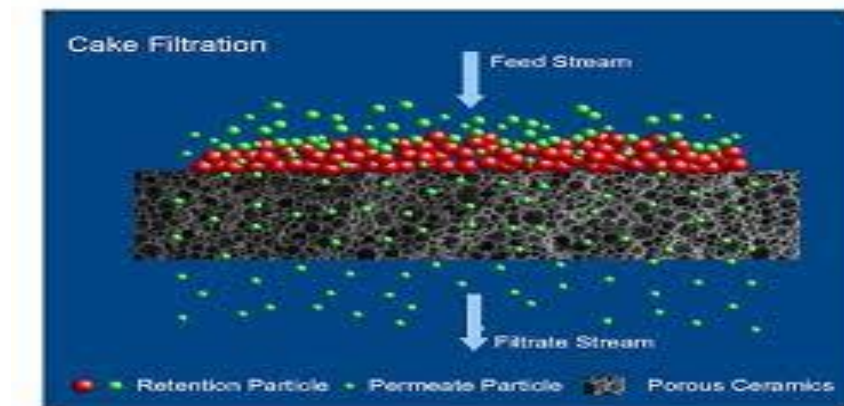


- Cross flow filtration

# Mechanisms of Filtration

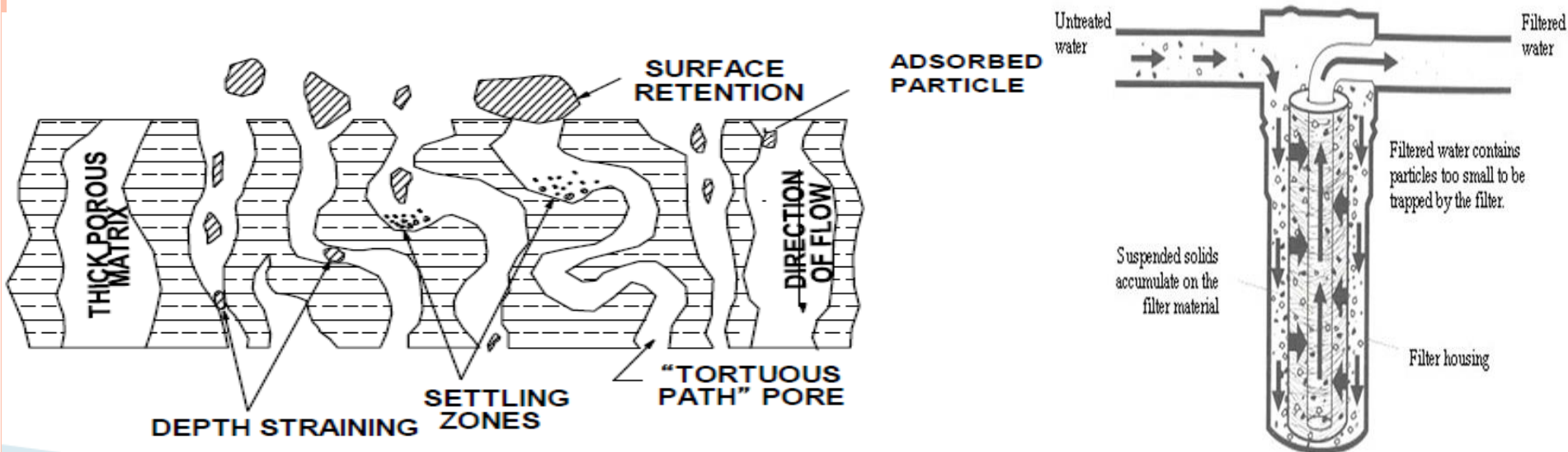
## 1. Cake Filtration:

- Majority of the solids particles are always larger than the openings in the filter medium and so the solids are retained as a cake of increasing thickness on the surface of the medium.
- The feed with relatively larger amounts of larger solids particles is best treated in cake filters.
- In cake filtration solids recovery or the cake formation is the main purpose.



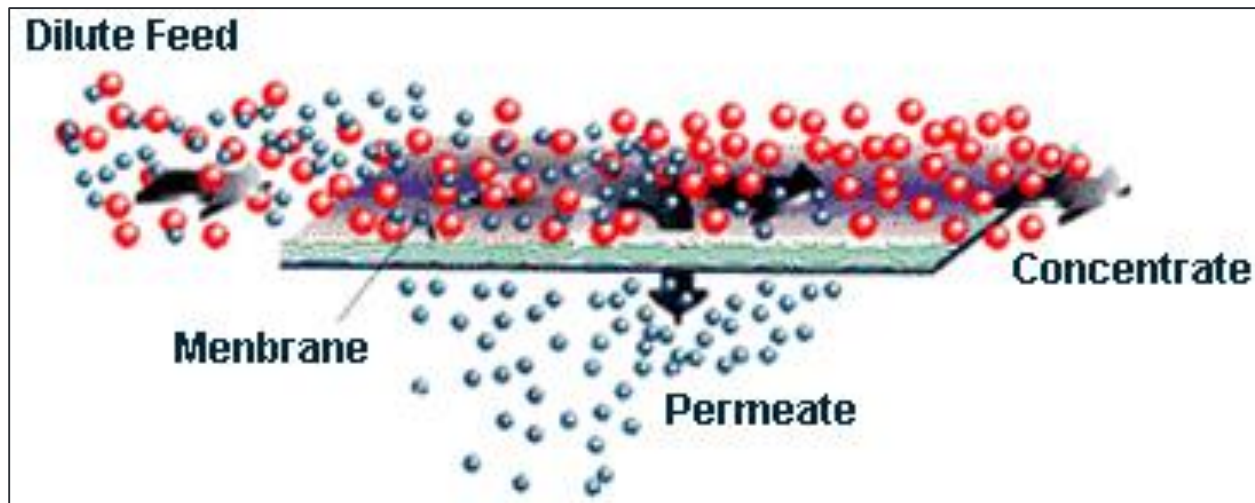
## 2. Clarifying Filtration:

- Solid particles will penetrate a considerable depth and ultimately get trapped inside the filter medium and usually no layer of solids or cake will appear on the surface of the medium.
- In this filtration normally solid particles are smaller than the openings in the filter medium and therefore can penetrate into the medium.
- Filter bed has limited capacity to trap solids so clarifying filters should treat only dilute slurries with fine-grained solids.



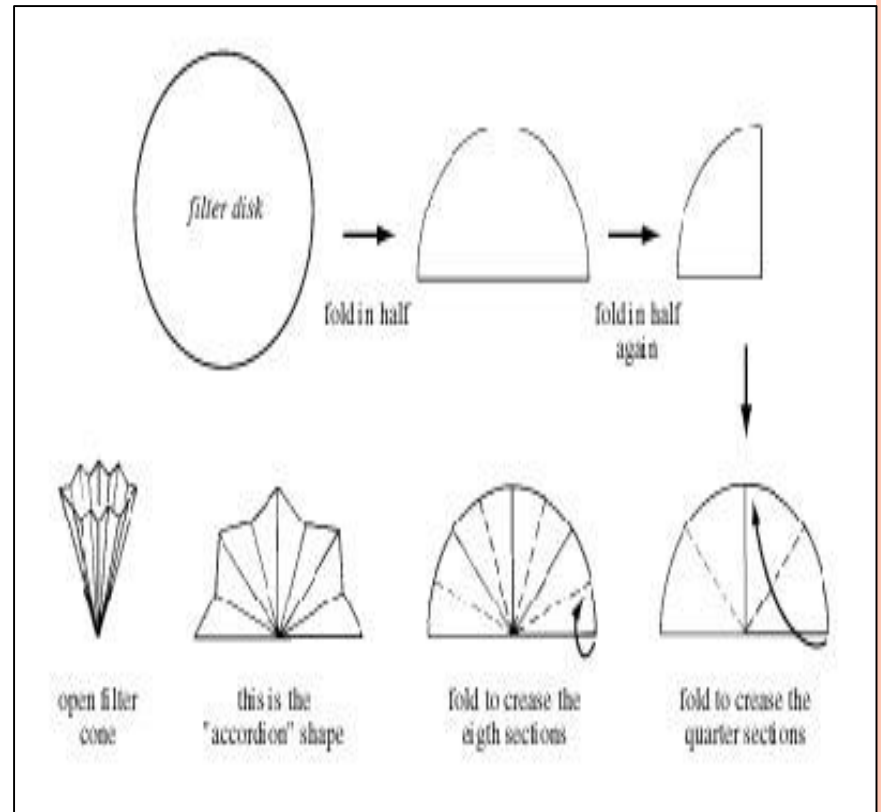
### 3. Cross-flow Filtration:

- In such type of filters, the feed suspension flows tangentially to the filter medium at very high velocity as a result the thin layer of solids formed on the medium is prevented from building up.
- The liquid passes through the medium as clear filtrate, thereby leaving a more concentrated suspension as a final product.



# FILTER MEDIA

The surface or medium upon which solids are retained in the process of filtration is known as filtration media



# PROPERTIES OF FILTER MEDIA

- Chemically inert
- High resistance power for the solids
- Should have sufficient mechanical strength to withstand filtration pressure
- Should absorb negligible amount of dissolve material
- Should have resistance for the corrosive action of the liquid
- Should not plug or blind
- Should offer as little resistance as possible to the flow of filtrate
- Should have ability to discharge cake easily and cleanly
- Should be cheap
- Should have long life



# TYPES OF FILTER MEDIA:

- 1) Filter cloth
- 2) Kraft paper
- 3) Fabric (bounded)
- 4) Cartridges
- 5) Glass wool
- 6) Sintered glass filter
- 7) Membrane filter



## Filter Aids

“The substances which when added to the liquid to be filtered, reduce the resistance of the filter cake and increase the filtration”.

### **Properties of Filter Aids:**

- i. Chemically inert
- ii. Low specific gravity
- iii. Insoluble in liquids
- iv. Form a porous cake
- v. Free from impurities
- vi. Suitable particle size with irregular shape
- vii. Able to remain suspended in liquids
- viii. Free from moisture



# Filter Aid Materials:

<b>Materials</b>	<b>Chemical composition</b>	<b>Advantages</b>	<b>Disadvantages</b>
Diatomaceous earth	Silica	Wide size range	Slightly soluble in acid and alkalis
Perlite	Silica +Aluminosilicate	Wide size range	More soluble
Asbestose	Aluminosilicate	Very good retaintion on coarse screen	More soluble
Cellulose	Cellulose	Chemically inert	Expensive
Carbon	Carbon	Non reactive with strong alkalis	Expensive



# FILTER AIDS



DIATOMACEOUS EARTH



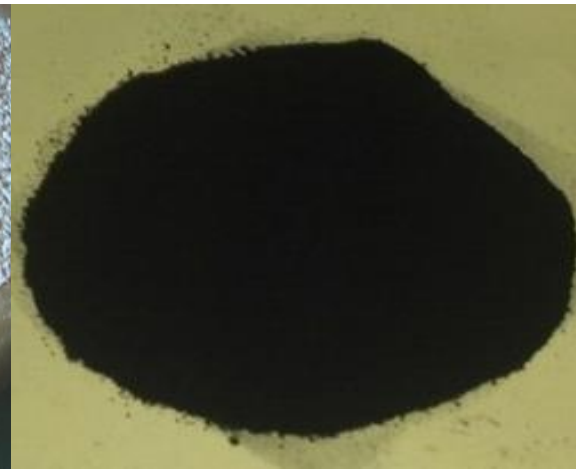
PERLITE



ASBESTOSE



CELLULOSE



CARBON



Thank you

