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FILTRATION

Definition :

The separation of solids from a suspension in a liquid with the help of a porous medium or septum which retains the solids and allows the liquids to pass in terms as filtrations

The rate of filtration = Driving force / resistant

The driving force required for a separation by filtration based upon the nature of suspension may be divided into four categories , namely gravity, Vacuum, pressure and centrifugal .

Eg. Separation of solids, organic , inorganic , sugar , paranitroaniline calcium carbonate etc.

Types of Filtrations

- **Cake Filtration** : The proportion of solids in the suspension is large and most of the solids particles are collected in the form of cake which can later be detached from the filter medium .
- **Deep bed filtration** The proportion of solids is very small and the particles of the solids being smaller than the pores of the filter medium will penetrate a considerable depth and ultimately get trapped inside the filter medium and usually no layer of solids will appear on the surface of the medium
(water filtration)

Filter medium

Selection of Filter medium :

In case of cake filtration , the choice of a filter medium is often the most important consideration in assuring satisfactory operations of a filter.

- It should retain the solids to be filtered, giving a reasonably clear filtrate.
- It should not plug or blind
- It should be mechanically strong to withstand the process conditions
- It should be resistant to the corrosive action of fluid.
- It should offer as little resistance as possible to the flow of filtrate.
- It should possess ability to discharge cake easily and cleanly.
- It should be very cheap
- It should be easily available with easily available
- It should have long life
- Filter Medium made by Canvas cloth, woolen cloth, metal cloth synthetic fibre cloth- nylon, polypropylene etc

Filter Aids.

- Filter aids is a granular or fibrous materials which packs to form a bed of very high voidage , because of this to increase the porosity of cake.
- Advantage: increase the rate filterations
- Eg. Saw dust, carbon, silica , china clay
- Filter aids are added in to filt rations process
- 1. Before filtration 2. Precoating

What are the factors effect the filtrations.

- **Pressure drop across the feed inlet and far side of the filter medium**
- **Filter area**
- **Viscosity, density of filtrate and solids**
- **Filter medium resistant**
- **Cake resistance**
- **Batch and continuous process**
- **The rate of filtration is directly proportional to pressure difference
ACROSS**

**Across a filter medium. Thereforre the higher the pressure difference
across medium , higher will be the rate of filtration**

Similarly directly proportional to filter area.

**The rate of filtration inversely proportional to viscosity , cake resistance
and medium resistance**

FILTER AIDS

- Slimy or very fine solids that form a dense impermeable cake quickly plug and any filter medium that is fine enough to retain them.
- Practical filtration of such materials requires that the porosity of the cake be increased to permit passage the liquor at a reasonable rate.
- (eg) Saw dust, silica, alumina perlite, other inner porous materials.
- Precoats prevent gelatinous solids from plugging the filter medium and give a clear filtrate.

