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INDUSTRIAL CHEMISTRY

ICH 351

1. **Filtration** is any of various mechanical, physical or biological operations that separate solids from fluids (liquids or gases) by adding a medium through which only the fluid can pass. The fluid that passes through is called the **filtrate** In physical filters oversize solids in the fluid are retained and in biological filters particulates are trapped and ingested and metabolites are retained and removed. However, the separation is not complete; solids will be contaminated with some fluid and filtrate will contain fine particles (depending on the pore size, filter thickness and biological activity). Filtration occurs both in nature and in engineered systems; there are biological, geological, and industrial forms. For example, in animals (including humans), renal filtration removes wastes from the blood, and in water treatment and sewage treatment, undesirable constituents are removed by absorption into a biological film grown on or in the filter medium, as in slow sand filtration.

Filtration in the industry ranges single straining to complex separations, the fluid maybe of any shape, type or form.

1. Since the flow in series, like resistance the pressure drop over the filter is the sum of individual pressure drop :

-∆P = Pa - P b = (P a - P 1 ) + (P 1 - P b) = - ∆Pc- DPm

Where;

-∆P= overall pressure drop

- ∆Pc= pressure drop over cake

- DPm= pressure drop over medium

Pa= Inlet pressure

P b = Outlet pressure

P 1 = Pressure at the boundary between the cake and the medium

1. Discontinuous pressure filters: It employs large pressure differentials across the septum to give economically rapid filtration of viscous liquids or fluids.

Continuous pressure filters: They are required to remove vapour cost required for filtration in batch or discontinuous pressure filters.