

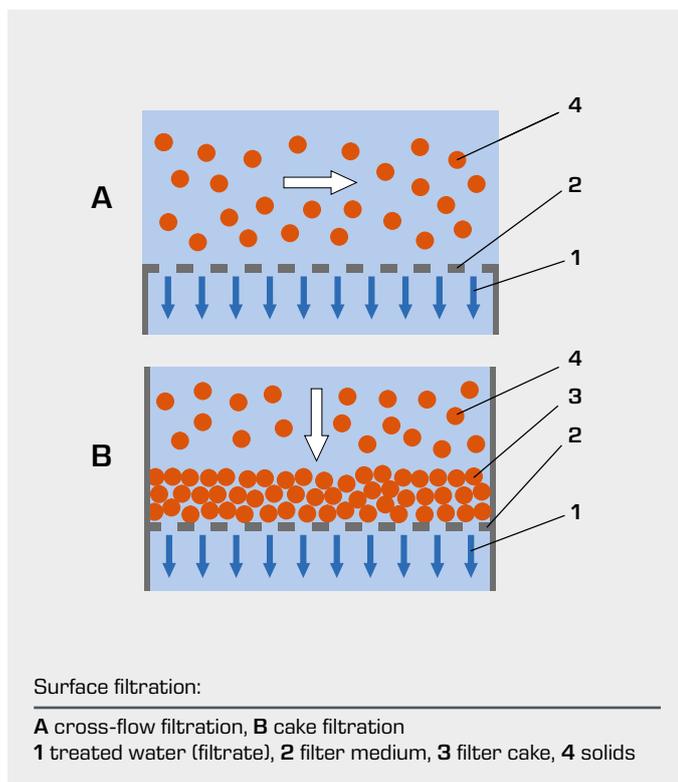
Basic knowledge

Filtration

Filtration is used to remove solids. The fundamental principle is that the solids are captured and retained by a filter medium. The liquid phase of the raw water passes through the filter, and is termed filtrate.

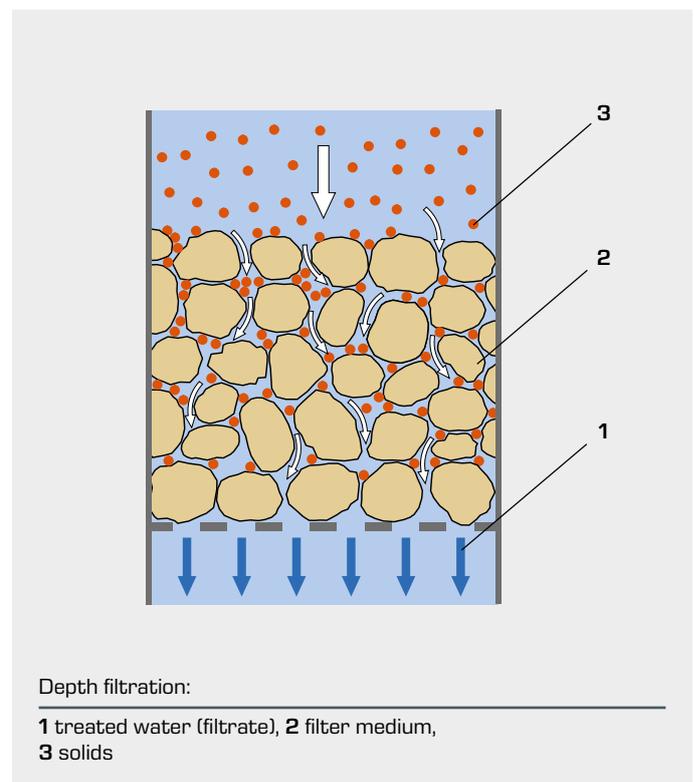
Surface filtration

Surface filtration is based on a screening effect. The solids do not penetrate the filter, but are held back on its surface. Therefore the pore width of the filter medium must be less than the size of the solid particles. Filter media used may be sieves, cloths, filter paper or membranes. If the flow is directed perpendicular to the surface, the term cake filtration is used. A filter cake builds up on the filter medium over time which reduces the flow rate of the filtrate. This is a disadvantage of this process. This



A fundamental distinction is made between depth filtration and surface filtration.

problem is countered in cross-flow filtration by causing the raw water to flow parallel to the surface. Deposits on the filter are then largely removed by the flow. This principle is applied primarily in the membrane separation processes.



Depth filtration

In depth filtration, the raw water flows through a bed of granular material (filter bed) such as sand or gravel. As the raw water flows through the interstices between the grains of the filter medium, suspended solids are captured and retained. The treated water passes through the filter bed. Over time, more and more solids collect in the flow channels of the filter bed. This reduces the cross-sectional area of the flow channels increasing the hydraulic resistance of the filter to the flow. This resistance is expressed as a loss of pressure. The flow through the filter decreases, or it can only be maintained by increasing the pressure on the inflow side of the filter. The deposited solids can be

removed by backwashing them. Consequently, the pressure loss is reduced by a backwash. This process usually takes place with treated water in the opposite flow direction.

The pressure trend over time in a filter bed can be depicted by filter resistance diagrams – also known as Micheau diagrams.