Viessman and Hammer (1985)

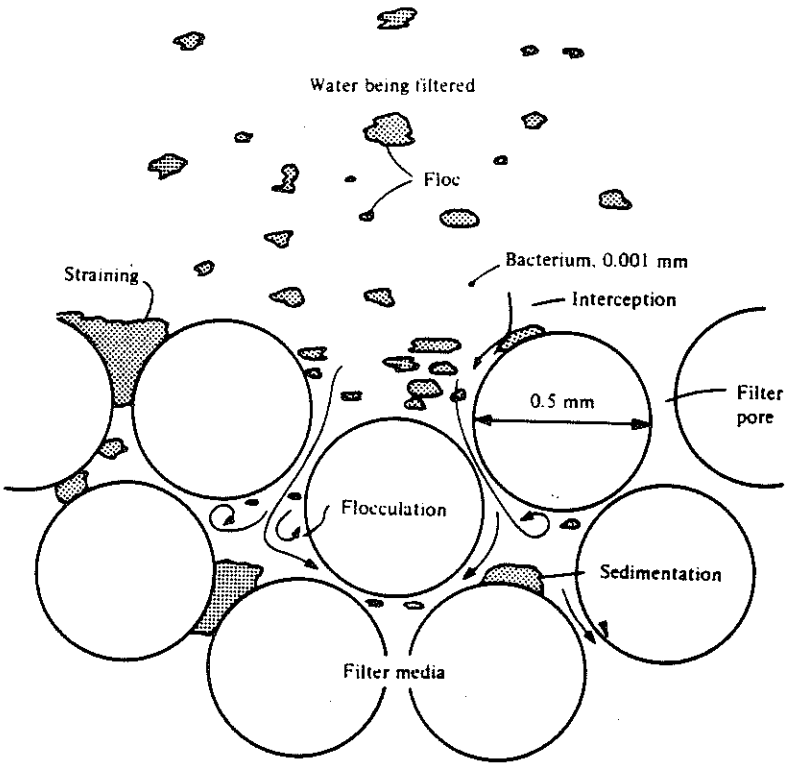
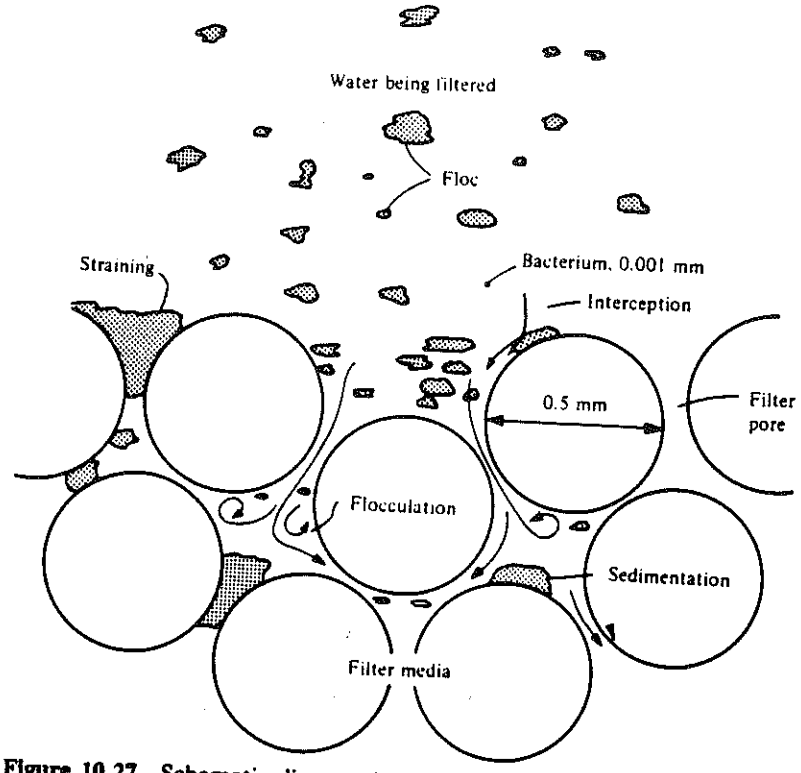


Figure 10.27 Schematic diagram illustrating straining, flocculation, and sedimentation actions in a granular-media filter.

The mechanisms involved in removing suspended solids in a granular-media filter are complex, consisting of interception, straining, flocculation, and sedimentation as shown schematically in Fig. 10.27. Initially, surface straining and interstitial removal results in accumulation of deposits in the upper portion of the filter media. Because of the reduction in pore area, the velocity of water through the remaining voids increases, shearing off pieces of captured floc and carrying impurities deeper into the filter bed. The effective zone of removal passes deeper and deeper into the filter. Turbulence and the resulting increased particle contact within the pores promotes flocculation, resulting in trapping of the larger floc particles. Eventually, clean bed depth is no longer available and breakthrough occurs, carrying solids out in the underflow and causing termination of the filter run.

Microscopic particulate matter in raw water that has not been chemically treated will pass through the relatively larger pores of a filter bed. On the other hand, suspended solids fed to a filter with excess coagulant carry-over from chemical treatment produces clogging of the bed pores at the surface. Optimum filtration occurs when impurities in the water and coagulant concentration cause "in-depth" filtration. The impurities neither pass through the bed nor are all strained out on the surface, but a significant

Viessman and Hammer (1985)



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