

# Particle Capture Mechanisms in Gases and Liquids: An Analysis of Operative Mechanisms in Membrane/Fibrous Filters

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## Abstract

Membrane filters are capable of reducing particles in fluids to very low levels through the action of several capture mechanisms. However, the effectiveness of these mechanisms at removing particles is influenced by the properties of the fluid undergoing filtration. This article reviews the theories of particle capture mechanisms and discusses their relative effectiveness in various fluid types.

Theory indicates that membrane filters remove essentially all particles from gas streams by interception and diffusion. In liquids, the operative particle capture mechanisms depend upon the physical chemistry of the particle-fluid-filter media system. Under favorable chemical conditions, the operative capture mechanisms are the same as in gases with essentially all particles removed. However, under unfavorable chemical conditions, only particle sieving occurs, and capture is greatly reduced. In addition, captured particles are less tightly held in liquids and shearing forces are larger, hence particle reentrainment is more likely.