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*Optimization of the Performance of Hollow Fiber Membrane Cassettes*

Hollow fiber membranes are very effective at removing suspended solids from liquid solutions via mechanical separation, but the formation of a cake layer and membrane fouling results in a rapidly decreasing flux during filtration. Some factors that influence the formation of the cake layer are the arrangement of the hollow fiber membranes in the feed, the trans-membrane pressure (TMP) during filtration, and the concentration of the feed solution. The “cassette design” has already been established as the optimum arrangement, and this work analyzes the ability of hollow fiber membrane cassettes (HFMC) to act as pseudo-inclined settlers during filtration (effectively reducing the concentration of the feed by settling particles out of solution more quickly), the effect that the TMP during filtration has on this ability, and the effect of both on the overall performance of the HFMCs. Filtrations were run with HFMCs at two angles (30° and 90°) and at four TMPs (-4, -10, -16, and -22 in. Hg), and the permeance decline with respect to accumulate mass/membrane area was monitored in order to establish membrane performance. Initial results are promising: in filtrations run at lower TMPs, HFMCs that were placed at an angle within the feed (in order to act as an inclined settler) maintained a higher percentage of their pure water permeance throughout the filtration than HFMCs placed vertically. While multiple repetitions of each filtration are needed to say anything with certainty, this indicates the ability for the HFMCs to act as pseudo-inclined settlers during filtrations.