

Abstract Submitted
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Mathematical modeling of the flow and fouling in a pleated membrane filter¹ DAVE PERSAUD, MIKHAIL SMIRNOV, New York Institute of Technology, DANIEL FONG, U.S. Merchant Marine Academy, PEJMAN SANAEI, New York Institute of Technology — Pleated membrane filters are essentially thin sheets of porous media sandwiched between two support layers, all of which are housed inside of a cylindrical cartridge. They are in widespread industrial use, since they offer a superior surface area to volume ratio in comparison to equal-area unpleated membrane filters. However their performance characteristics are inferior to those of flat sheet media. We developed a simplified mathematical model, which accounts for the pleated membrane geometry as well as two mechanisms of fouling: (i) adsorption of small particles within membrane pores and (ii) blocking of entire pores by large particles. Using asymptotic analysis based on the small aspect ratio of the pleat, we simplify our model and compare the obtained results to those of equivalent flat sheet media filters.

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