Performance of constant-flux immersed UF membrane treating petroleum refinery wastewater

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ABSTRACT

Application of immersed membrane process in treating synthetic and real petroleum refinery wastewater was investigated. The synthetic wastewater investigation was operated at constant flux mode (15, 25, and 40 l/m² h) allowing the transmembrane pressure (TMP) to increase with time and oil contents of 20, 50, and 100 mg/l. On the other hand, the real wastewater study was conducted at permeate flux values of 15, 25, and 40 l/m² h. The results of the investigation showed that the membrane performance was dramatically affected by wastewater oil content and permeate flux values. The maximum allowable TMP value of 9 was found to be reached frequently with the increase in permeate flux and oil content that resulted in more backwashing and cleaning cycles. As an example, at flux value of 40 l/m² h, the membrane module was backwashed 9, 12, and 30 times when oil contents were 20, 50, and 100 mg/l, respectively. Moreover, fouling resistance was found to increase when permeate flux and oil content increased.

Keywords: Constant flux; Transmembrane pressure; Synthetic and real wastewater; Fouling resistance; Membrane cleaning; Permeate quality