

INTRODUCTION TO VIBRATORY SHEAR ENHANCED MEMBRANE PROCESS AND ITS APPLICATION IN STARCH WASTEWATER RECYCLE

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Abstract

Membrane application in wastewater is gaining significant popularity. Selecting the right membrane and filtration technique is an important consideration to ensure a successful system development and long term performance. A new type of membrane filtration technology known as 'Vibratory Shear Enhanced Process' (VSEP) is introduced in this paper with some test results that has been conducted with VSEP pilot unit to recycle starch wastewater. Conventional cross flow membrane process used in wastewater application always led to rapid fouling. This loss in throughput capacity is primarily due to the formation of a layer that builds up naturally on the membranes surface during the filtration process. In addition to cutting down on the flux performance of the membrane, this boundary or gel layer acts as a secondary membrane reducing the native design selectivity of the membrane in use. This inability to handle the buildup of solids has also limited the use of membranes to low-solids feed streams. In a VSEP system, an additional shear wave produced by the membrane's vibration cause solids and foulants to be lifted off the membrane surface and remixed with the bulk material flowing through the membrane stack. This high shear processing exposes the membrane pores for maximum throughput that is typically between 3 and 10 times the throughput of conventional cross-flow systems. The short term results with raw starch wastewater shows very stable flux rate of 110 l/mh using the VSEP system and selecting the PVDF ultrafiltration membrane with no pre-filtration.

Key words: VSEP, Ultrafiltration (UF), membrane flux, transmembrane pressure (TMP), wastewater reuse