Membrane Bioreactor (MBR)

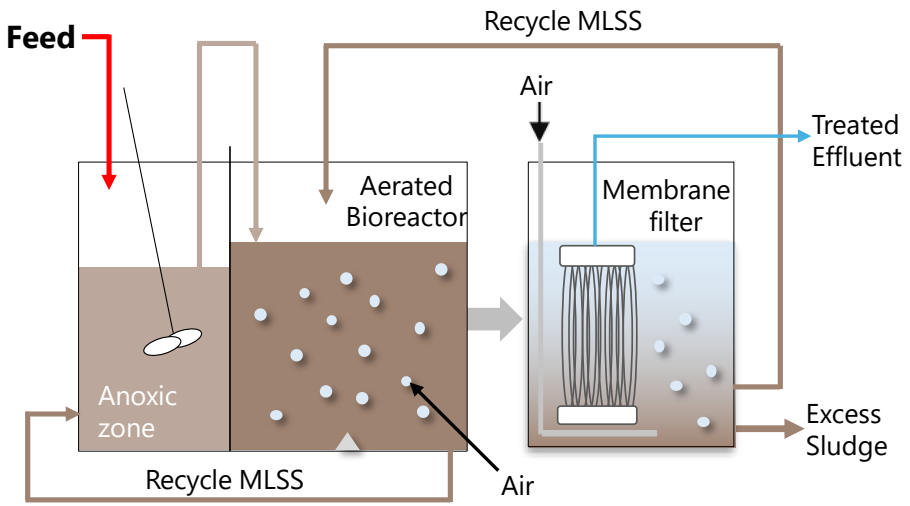
Process Description

MBR combines biological treatment with membrane filtration to achieve efficient removal of organic contaminants and suspended solids from wastewater. The process relies on microorganisms to biodegrade organic matter, while an ultrafiltration (UF) membrane retains biomass and produces a high-quality effluent.

MBR systems typically operate at high biomass concentrations (8,000–10,000 mg/L mixed liquor suspended solids (MLSS)), enabling a smaller footprint and longer solids retention times than conventional systems. Aeration serves a dual role by supplying oxygen for biological treatment and scouring the membrane surface to mitigate fouling. UF provides near-complete suspended solids removal, with periodic backwashing and chemical cleaning required to manage membrane fouling.

MBRs are typically used for wastewater reuse applications and as a pretreatment step for downstream processes such as reverse osmosis.

Process Schematic



Publications

- Assessing the bio-treatability of produced water from a Qatari gas field (Link)
- Biotreatment of hydrate-inhibitor-containing produced waters at low pH (Link)
- Feasibility and application of membrane aerated biofilm reactors for industrial wastewater treatment (Link)
- Screening of advanced produced water technologies: overview and testing results (Link)

For further information, please contact us at email: GWSC@conocophillips.com