

Introduction

- Thermal driven membrane separation process, such as

Objective

Normal VMD (Pre-heating/OneUnit):

- Energy is recycled from retentate stream.

Alternative submerged VMD(Post-heating):

- Additional energy is required for submerge VMD to provide heat for evaporation.
- The alternative process utilizes heat from permeate by further heating up to 100 °C and re-direct back to the submerged VMD.

Alternative Cross-flow VMD (FourUnit):

- Cross-flow VMD relies heat from high inlet feed flowrate to support evaporation, which limits the water recovery level.
- The alternative process mimics the RO process design ideology for increasing water recovery by putting several units in series.

Visualization

Results & Discussions

Conclusion