

Evaluating the performance of forward osmosis as a pre-treatment process for multi-stage flash seawater desalination at a pilot scale

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Abstract:

This study evaluated the performance and the economic feasibility for using the forward osmosis process as a pretreatment for multi-stage flash seawater desalination process. The experiment has been done at a pilot scale using a commercial hollow fibre forward osmosis membrane and real feed and draw solutions. The feed solution used in this study was seawater and the draw solution was brine rejected generated by multi-stage flash seawater desalination plant. Various running parameters have been tested to evaluate the performance of the forward osmosis process under a variety of conditions. The maximum recovery rate of the process was almost 30% using the most optimized running conditions. In addition, it was found that using the forward osmosis as a pretreatment process could be more economical compared to other available technologies.

Keywords: Forward Osmosis; Seawater desalination; Multi-stage flash; Brine; Scaling