

**Abstract**  
**Process Economics Program Report 190B**  
**PERVAPORATION**  
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Advances in ongoing membrane research and technology developments in membrane systems have led to the commercial development of several applications for the use of pervaporation membranes in the chemical manufacturing and wastewater treatment industries. We have identified membrane materials and modules that have the commercial use potential, and have listed major suppliers of both commercial and demonstration pervaporation systems. In addition, we investigated the economic merits of employing pervaporation as a process for separation of selected aqueous-organic and organic-organic liquid mixtures. Aqueous-organic mixture separations include the separation of reduced concentrations of water from organic process streams and removal of low concentrations of dissolved organic compounds from aqueous wastewater streams.

The economic feasibility of dewatering solvents by evaluating the separation of water from ethanol is demonstrated, and results are compared with estimated capital and operating costs for conventional azeotropic distillation operations. We also have developed economics for recovering volatile organic compounds such as trichloroethylene from an aqueous wastewater, and have reviewed the latest research developments in organic-organic mixture separations.

Finally, pervaporation system sales and market growth rates are reported for each major industrialized world region, along with an explanation of major market driving forces and a list of developmental pervaporation membrane applications for solvent dehydration. Organic-organic separation may be the most significant long-term potential application for pervaporation, but considerable membrane material and process development remains to be done. In all the above applications, the most successful processes require integration with existing conventional separation unit operations.

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