

# How Water Works

ILLUSTRATED PROCESSES, EQUIPMENT, AND TECHNOLOGY

## Membranes: A Competitive Alternative to Conventional Treatment

**T**he use of membranes for producing potable water has become a competitive alternative to the conventional treatment process. Membrane plants are reliable, cost-competitive, and easily operated and maintained; they can be remotely monitored; and they produce a superior finished water quality that doesn't vary significantly from fluctuations in raw water quality, unlike conventional treatment plants. Trends indicate that membrane filtration will play a more dominant role in the US surface water treatment market in future years.

1. Membrane feed pumps deliver raw water to membrane banks at the required flow and operating pressure.
2. Pretreatment chemicals and coagulants, such as ferric sulfate, are applied to the feedwater to achieve desired water quality objectives and protect the membranes from damage or fouling.
3. Clean-in-place systems apply a chemical solution (or series of solutions) to a membrane unit to remove accumulated foulants, thereby restoring permeability and resistance to baseline levels.
4. Compressors and blowers supply large volumes of pressurized air to maintain process and valve requirements.
5. Membrane modules share common valving that allows each unit to be isolated from the rest of the system for testing and maintenance. Feedwater enters the bottom of the module and is distributed uniformly to the outside of hollow fibers mounted into pressure tubes.
6. A strainer is included on the feedwater line to prevent debris from clogging small passages in the system.
7. High-service pumps transfer water to the distribution system. The water is disinfected prior to distribution.

Some illustration elements exaggerated for emphasis.