



FILMTEC Membranes

System Design: System Components

High Pressure Pump

The pump discharge pressure has to be controlled to maintain the designed permeate flow and not exceed the maximum allowed feed pressure, which is:

600 psi (41 bar) for TW30, BW30, and NF elements

1,000 psi (69 bar) for SW30

1,200 psi (82 bar) for SW30HR elements

See the [latest product information sheet](#) to verify the correct limit.

A **positive displacement pump** cannot be throttled, so feed pressure is controlled by a backpressure valve in a bypass line from the pump discharge to the pump suction. A pulsation damper (accumulator) on the pump discharge line is used to minimize pressure surges. A relief valve ensures that the maximum allowed pressure will not be exceeded.

A throttling valve on the discharge line controls a **centrifugal pump**. Fixed speed motors are used with centrifugal pumps for most membrane systems. Using a variable speed motor is an energy-saving alternative although the cost is higher. Variable speed motors should be considered when there is greater than 5°C difference between the low and high feed-water temperatures.

In seawater systems, typically 55 to 60% of the pressurized feed water leaves the system with about 870 psi (60 bar) pressure in the concentrate stream. This energy can be recovered to decrease the specific energy demand of the system. Energy recovery methods are:

- Pelton wheel
- Reverse turning turbine
- Piston type work exchanger

The high-pressure concentrate is fed into the energy recovery device where it produces a rotating power output. This is used to assist the main electric motor in driving the high-pressure pump. Compared to traditional pump drives, the energy recovery system represents energy savings up to 40%.

FILMTEC™ Membranes
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Notice: The use of this product in and of itself does not necessarily guarantee the removal of cysts and pathogens from water. Effective cyst and pathogen reduction is dependent on the complete system design and on the operation and maintenance of the system.

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