

4-4. Single Pressure Vessel System

A Single Pressure Vessel System consists of a pressure vessel with up to seven membrane elements, which are connected in series. The concentrate of the first element becomes the feed to the second, and so on. The product tubes of all elements are coupled and connected to the vessel permeate port. The permeate port may be located on the feed and or on the concentrate end of the vessel.

Single Pressure Vessel Systems are chosen when only one or few membrane elements are needed for the specified permeate flow.

Feed water enters the system through the shut-off valve and flows through the cartridge filter to the high pressure pump. From the high pressure pump, the feed water flows to the feed inlet connection of the vessel. The product stream should leave the vessel at no more than 0.3 bar (5 psig) over atmospheric pressure. In other words, in any event, the back pressure of the permeate must not be greater than the feed pressure in order not to damage the membranes.

The concentrate leaves the concentrate outlet connection at essentially the feed pressure.

Pressure drop will usually amount to 0.3 to 2 bar (5~30 psig) from feed inlet to concentrate outlet, depending on the number of membrane elements, the feed flow velocity and the temperature. The concentrate flow is controlled by the concentrate flow control valve.

The system recovery is controlled by this valve and must never exceed the design value.