

4-7. Double Pass System

A double pass system is the combination of two RO systems where the permeate of the first system (first pass) becomes the feed for the second system (second pass). Both RO system may be of the single-array or multi-array type, either with continuous flow or with concentrate recirculation. With this concept, a product conductivity of $< 1 \mu\text{S}/\text{cm}$ can be achieved without any contamination from organic matter and pyrogens including bacteria. Thus applications of double pass systems can be found in the production of pure water for pharmaceutical, medical and semiconductor industries.

Figure 5 shows a schematic flow diagram of a double pass system.

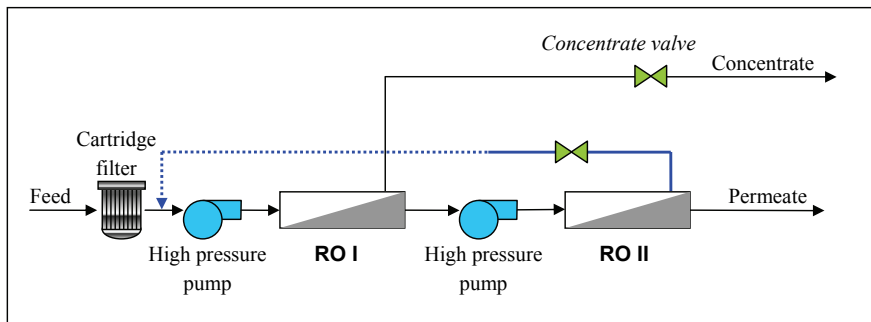


Figure 5 : Double Pass System

The concentrate of RO II could be recycled back to the feed of RO I, because its quality is usually better than the system feed water.

The concentrate of RO is of high quality (RO permeate). RO II can be designed for a higher recovery than RO I and with fewer membrane elements.

Instead of having a separate high pressure pump for the second pass, the whole system can also be operated with one single high pressure pump, provided the maximum permissible feed pressure of the membrane element is not exceeded (41 bar (600psig) for brackish water elements).

The second pass is then operated with the permeate backpressure from RO I. Care must be exercised that the permeate backpressure at no time exceeds the feed pressure by more than 0.3 bar (5psig)