Low Salt Rejection Reverse Osmosis (LSRRO)

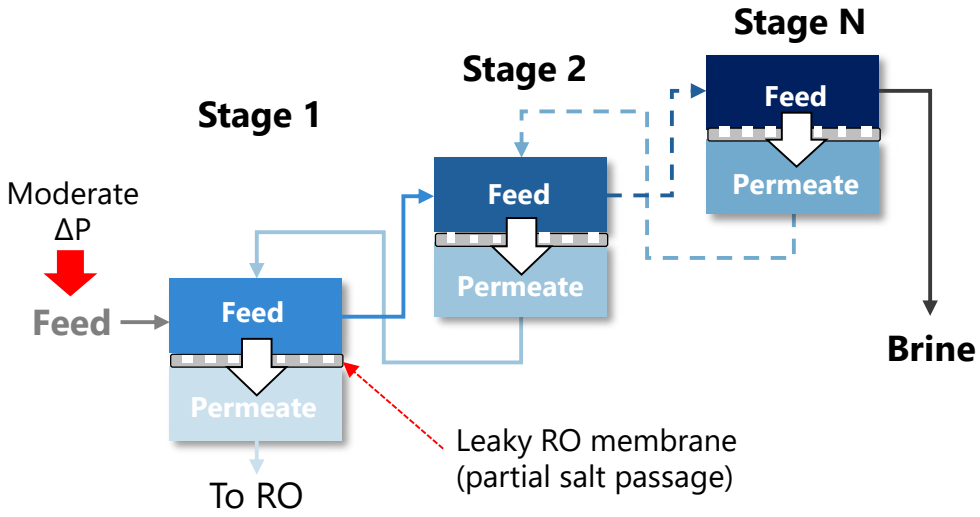
Process Description

LSRRO is an advanced reverse osmosis (RO) configuration designed to treat high-salinity brines beyond the practical operating limits of conventional and high/ultra-high-pressure RO systems.

LSRRO is often grouped within the broader family of osmotically assisted reverse osmosis (OARO) processes. A defining feature of LSRRO is the use of membranes with deliberately reduced salt rejection (referred to as loose membranes), allowing a controlled amount of salt to permeate together with water. The resulting saline permeate generates a nonzero osmotic pressure on the permeate side, thereby reducing the osmotic pressure difference across the membrane and lowering the hydraulic pressure required for operation. LSRRO can utilize conventional spiral-wound RO modules and infrastructure, allowing integration with existing RO facilities.

Multi-stage LSRRO systems achieve high brine concentration and water recovery for brine management and volume reduction applications.

Process Schematic



Publications

- Osmotically assisted reverse osmosis: assessing pretreatment on hypersaline produced water (Link)
- Experimental comparison between low salt rejection and counter flow reverse osmosis for produced water desalination (Link)

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