

MBC™

MemBrine Concentrator™

Membrane brine concentration to 280,000 mg/L TDS

OVERVIEW

The MemBrine Concentrator (MBC) concentrates brine from 90,000 mg/L TDS, the practical limit of conventional reverse osmosis, to 220,000–280,000 mg/L TDS. It performs the concentration duty conventionally assigned to thermal evaporators at 5–12 kWh/m³ of water removed, compared with 25–60 kWh/m³ for thermal processes, using standard spiral-wound membrane elements and pressure vessels.

KEY FEATURES

Thermal duty replacement

Up to five times lower specific energy than evaporation for the same concentration step.

Crystallizer feed

Concentrate at crystallization strength limits crystallizer capacity to the residual flow.

DLE compatibility

Concentrates lithium eluate from adsorption, ion-exchange, and electrochemical extraction processes.

TYPICAL APPLICATIONS

- Zero and minimal liquid discharge ahead of crystallization
- Brine mining and mineral recovery
- Lithium brine and DLE eluate concentration
- Produced water volume reduction

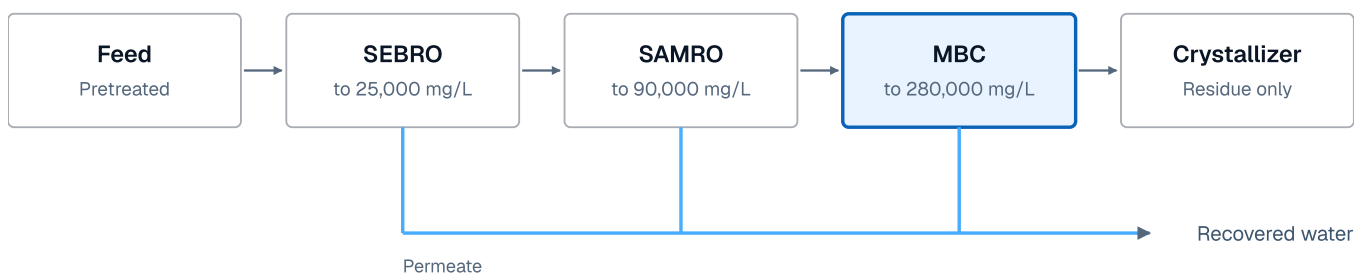
SPECIFICATIONS

Feed salinity	≥ 90,000 mg/L TDS
Concentrate salinity	220,000–280,000 mg/L TDS
Specific energy	5–12 kWh/m ³ of water removed
Thermal reference	25–60 kWh/m ³ of water removed
Concentration ratio	≈ 3× the conventional RO limit
Membrane equipment	Standard spiral-wound elements and pressure vessels
Upstream process	SAMRO or conventional reverse osmosis
Downstream process	Crystallization, selective recovery, or disposal

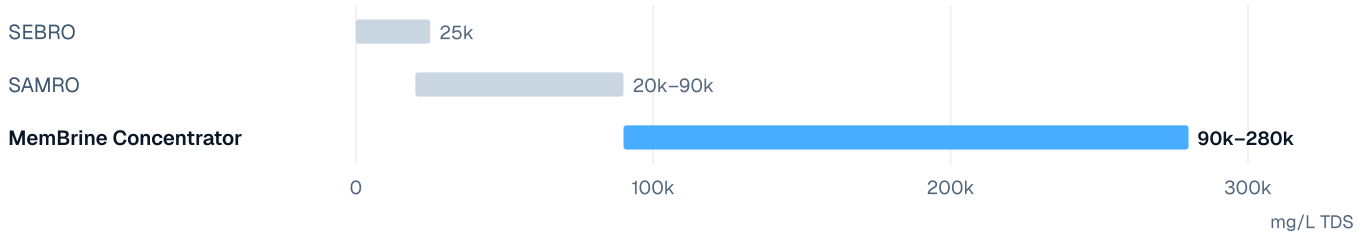
SCOPE OF SUPPLY

- Process design, mass balance, and design basis
- Membrane skids with high-pressure pumps and energy recovery devices, as required
- Instrumentation, control system, and control philosophy
- Factory acceptance testing
- Commissioning, performance testing, and operator training
- Operations support and service

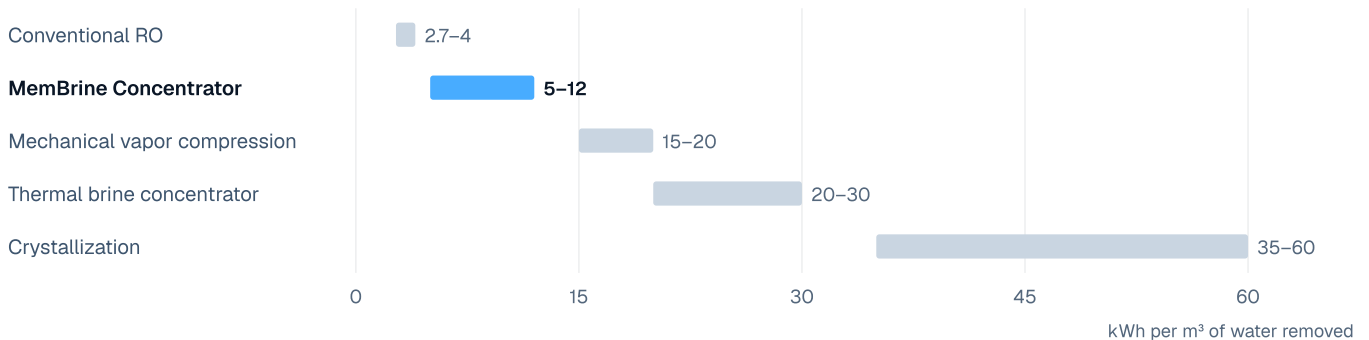
POSITION IN AN OSMOSYS TREATMENT TRAIN



PLATFORM OPERATING ENVELOPES



SPECIFIC ENERGY BY CONCENTRATION ROUTE



PLATFORM SPECIFICATION

Process	Operating range, mg/L TDS	Specific energy	Role in the train
SEBRO	≤ 25,000	Feed-dependent	First stage on dilute feeds
SAMRO	20,000 → 90,000	0.48 kWh/m³ on seawater	High-recovery desalination
MBC	90,000 → 220,000–280,000	5–12 kWh/m³	Brine concentration
Thermal evaporation	≥ 90,000	25–60 kWh/m³	Conventional alternative

DATA REQUIRED FOR A FEASIBILITY ASSESSMENT

- ☐ Design flow rate and expected variability
- ☐ Full ionic analysis, including silica
- ☐ TDS, pH, and temperature range
- ☐ Suspended solids, SDI, and turbidity
- ☐ Organics: TOC, COD, and oil and grease where present
- ☐ Target recovery, concentrate strength, or discharge limit
- ☐ Site utilities and footprint constraints

ENGAGEMENT

01 Feasibility

Flow, full chemistry, variability, and the treatment objective, compared with the incumbent disposal or thermal route.

02 Pilot

Bench and pilot testing on site water to establish recovery, energy, pretreatment, and achievable concentration.

03 Design and supply

Process design, P&IDs, and control philosophy, with supply of the membrane stages or the complete packaged system.

04 Commissioning and operation

Performance testing against the design basis, operator training, and long-term operating support.