

Industrial Desalination Options & Saltworks' Product Fit Map



| Technology | Chemical Softening | Conventional Reverse Osmosis (RO) < 1200 psi | Ultra-High Pressure RO < 1800 psi | Electrodialysis Reversal (EDR) | Evaporator-Crystallizer-Solids Management |
|-------------------------|---|---|---|---|---|
| Fit | Reduces scale potential prior to desalination with other technologies. | Most commonly used membrane desalination technology. | Achieves 2x greater brine concentrations than conventional RO if scale is managed. | Desalinates higher organics than RO, low TDS; produces highly concentrated brines. | Thermal evaporative systems concentrate brine further after membrane systems reach operational limits. |
| Max Brine Concentration | N/A | < 80,000 mg/L ¹ | ~ 130,000 mg/L ¹ | ~ 180,000 mg/L ¹ | Zero liquid discharge (ZLD) & solids. |
| Cost | \$ - \$\$ | \$ | \$\$ | \$ - \$\$ | \$\$\$ |
| Tolerance for Organics | N/A | X | X | ✓ | ✓ |
| Tips | <ul style="list-style-type: none">• Verify economics for using pretreatment, especially chemical consumption.• Plan for sludge disposal.• Reduce labour costs by investing in automation. | <ul style="list-style-type: none">• Maximize RO recovery before expanding your treatment train.• Reach higher brine concentrations by testing your water chemistry and removing scaling ions: Ca, Si, SO₄, F, etc.• Upgrade RO performance by adding chemical softening (BrineRefine) or complimentary membrane systems (XRO or Flex EDR). | <ul style="list-style-type: none">• Scaling compounds may prevent achieving maximum recovery. Seek water treatment expertise to remove limits imposed by scaling water chemistry.• Plan for higher energy and lower flow than conventional RO, which may still be more cost effective than evaporators. | <ul style="list-style-type: none">• Treats water that is too challenging for RO (i.e. high organics or silica).• Desalt to any level (i.e. 1500 mg/L).• TDS change in desalinated flow will determine cost.• Unaffected by silica scaling limits.• Electrodes and membranes can scale with high hardness. | <ul style="list-style-type: none">• Explore brine management options and economics before proceeding to evaporation systems.• Ensure scaling does not impact performance by analyzing water chemistry and considering a pilot test.• If applicable, pre-concentrate with membranes.• For smaller flows (<200 m³/day), bypass membrane system treatment steps. |
| Saltworks Solution | BrineRefine | ZLD Experts / BrineRefine | Xtreme RO | Flex EDR | SaltMaker |
| Advantage | <ul style="list-style-type: none">• Compact, modular chemical softening with precision controls to prevent waste, improve operations, and automate solids management.• Handles variable and changing water chemistries• Automation integrates seamlessly with reverse osmosis to maximize system performance. | <ul style="list-style-type: none">• We help you maximize RO performance.• When paired with our intelligent controls, BrineRefine and RO work together in an integrated system.• We work with RO vendors to make sure you have a state-of-the-art RO system and 24/7 expert support via ROAM (Remote Operations & Asset Management). | <ul style="list-style-type: none">• Enabled by higher pressure spiral wound reverse osmosis membranes.• Achieve maximum brine concentrations by removing scaling limits with BrineRefine.• Fully packaged automated system. We can deliver the full package or work with RO vendors of your choice. Xtreme RO provides start-of-the-art RO with maximized recovery and 24/7 expert support via ROAM (Remote Operations & Asset Management). | <ul style="list-style-type: none">• Desalinate challenging produced water.• Next-generation IonFlux ion exchange membranes that withstands solvents, hydrocarbons, and offer 98% monovalent ion selectivity.• Leave hardness in using our patented electrode blocker.• Selective removal of monovalent ions (Li, Na, Cl, etc.) with Flex EDR Selective.• Treat highly scaling water (Ca/Na > 1) using Flex EDR Selective.• Destroy ammonia with Flex EDR Ammonia. | <ul style="list-style-type: none">• Treats a wide variety of saline waters without pretreatment and reliably achieve ZLD.• Smart design with self-cleaning and intelligent automation.• All-in-one, modular package that performs evaporation, crystallization, and solids management.• Avoids complex multi-step processes while removing single point of failure risks.• Smart ZLD with 24/7 expert support via ROAM. |

Notes

1. Maximum achievable brine concentration is dependent on water chemistry & capacity needs. Contact Saltworks for free engineering analysis.

2. Depending on the inlet water conditions, a number of these technologies can be combined to optimize system performance and cost.

3. Inlet TDS must be lower than the max brine concentration. Recovery = 1 – (Inlet TDS / Outlet TDS)

4. [ZLD Experts](#) can help you optimize your entire process, manage risk, and build-in smart controls.

Contact us to get started on your project:

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