

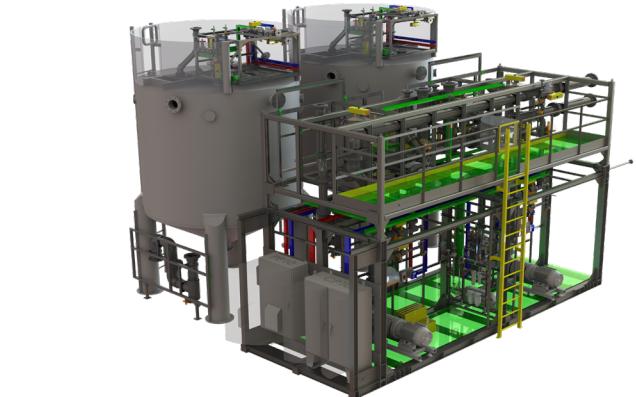
BrineRefine

Modular Chemical Reactor for Industrial Water + Lithium

- A versatile continuous stirred tank reactor (CSTR): compact, modular and expandable, with built-in N+1 redundancy
- Single package with precision dosing and intelligent controls that communicates upstream and downstream for total process optimization
- Pair with RO: chemical softening removes scaling ions, increasing downstream freshwater recovery
- Target ions of concern: avoid over-treatment by targeting troublesome ions for precipitation and filtration
- Remove impurities in lithium brines or precipitate refined >99.9% purity lithium carbonate (Li_2CO_3)
- Combine with clarifiers, XtremeUF ultrafiltration, filter press, centrifuge, or use slurry discharge as your project requires



A 3D render of two integrated BrineRefine-20 plants



A 3D render of a BrineRefine-70 plant



Two integrated modular BrineRefine-20 plants

Versatile Continuous Stirred Tank Reactor

Execute chemical reactions: stirred, staged, and with optional heating/cooling. Programmable logic controller (PLC) integrates with external process control.

Modular, Scalable, Adaptable Packages

Repeatable blocks with all required equipment onboard: reactors, mixers, process and automation. Built-in chemical dosing automation adjusts to variability in process or chemistry.

Built for Corrosive Applications

Engineered, plastic wetted parts: CPVC pipework, chemically resistant glass-reinforced fiber vessels, corrosion-resistant mixers.

Cost-Effective Ion Targeting

Target ions of concern for precipitation and filtration to avoid over-treatment e.g., fluorides, phosphates, sulfates, cyanide, hardness, metals, silica.

Maximize RO Recovery

Remove scaling ions. Maximize membrane system recovery up to osmotic pressure limits. Partner with XtremeUF for RO-safe solids management.

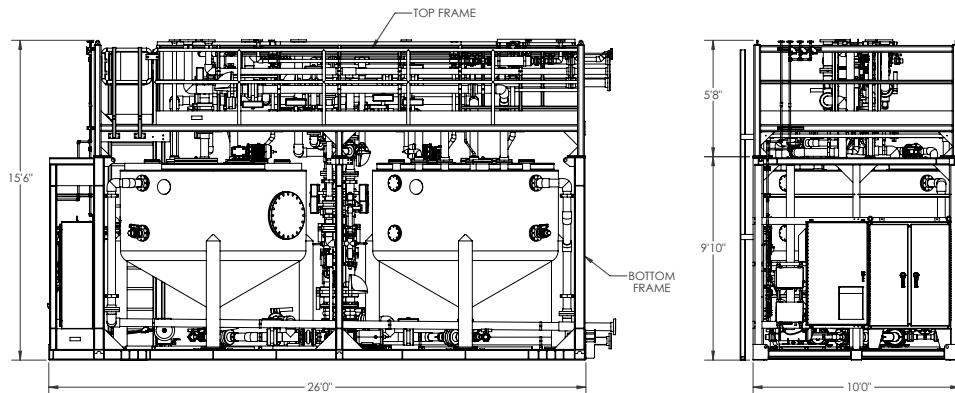
Lithium Carbonate Reactor & Wash

Achieve battery-grade lithium carbonate production with built-in wash and water/carbonate recycling system.

Specifications

Inlet Water Spec	Vast flexibility; contact Saltworks
Chemicals	Dependent on water chemistry; contact Saltworks
Electrical Energy	~2 kWh/m ³ (50 kW)
Power	Standard: 480 VAC, 3-phase, 60 Hz Options: matched to site needs
Solids Management	Filter press, centrifuge, or other

	BrineRefine-20	BrineRefine-70
Design	<ul style="list-style-type: none"> Fully modular reactors in frames 2 x 10 m³ = 20 m³ reactors per frame Balance of plant (BOP) and controls on-board reactor skids (one package) <p>Add units in series or parallel to meet capacity and reaction time needs. Increase capacity by adding N modules.</p>	<ul style="list-style-type: none"> Stand-alone modular reactors + modular balance of plant skids 2 x 35 m³ = 70 m³ reactors (site installed)
Nominal Flow Capacity	N x 600 m ³ /day (~30 min reaction time) N x 110 GPM	N x 2,500 m ³ /day (~30 min reaction time) N x 459 GPM



One BrineRefine-20 module. Add modules to increase capacity or upgrade to a BrineRefine-70

Automation

- Intelligent process control of reaction sequences
- Precision chemical dosing control
- Built-in flush and smart slurry management
- Auto start-up, capacity ramp, hibernate, shut down
- Maximizes uptime with minimized operator intervention
- Maximizes system performance via communication with upstream and downstream assets
- Ability to bypass a reactor for maintenance while running
- Representative BrineRefine pilot and testing unit available



BrineRefine pilot and testing unit

Delivery Models

Saltworks delivers complete industrial wastewater treatment or "concentrate, refine and convert" lithium refining packages, or works with engineering companies and other vendors to deliver a partnered project.