
ZERO LIQUID DISCHARGE

Overcome industry challenges
through knowledge and experience >

TITAN SALT'S ZLD SOLUTIONS

Technologies

Pretreatment:

- ✓ Separation of hydro carbons
- ✓ Chemical treatment
- ✓ Backpuls filtration system
- ✓ Pre-concentrators (RO)

Technologies:

- ✓ Falling film evaporator
 - Seeded slurry (brine concentrators)
 - Non-seeded evaporators
- ✓ Forced circulation crystallizers
- ✓ Dewatering
 - Filter press
 - Centrifuge
 - Drum dryers
- ✓ Hybrid ZLD systems

Applications:

- ✓ Cooling tower blowdown
- ✓ Applications
- ✓ Oiler blowdown
- ✓ RO reject
- ✓ Scrubber blowdown
- ✓ Produced water
- ✓ IGCC gray water
- ✓ Landfill leachate
- ✓ Desulfurization purge
- ✓ Demineralization waste
- ✓ Oil refinery effluent
- ✓ Radwaste
- ✓ Plant drains
- ✓ Fracking water

Chemical Plant Sarnia ON, 55gpm, 2017

4 effect steam driven system producing 99,98% pure, coarse sodium sulfate crystals.

An Environmental Necessity!

Today's strict discharge requirements, demand cost-effective, energy-efficient and reliable wastewater treatment solutions. More and more industries are prohibited from discharging any liquid waste originating from their facilities, either to meet regulations or for situations where scarcity of water demands water recovery. Titan Salt's innovative Zero Liquid Discharge (ZLD) technologies help you achieve environmental compliance, reduce your carbon footprint, create positive public perception and recover a valuable product or high purity water for reuse.

Wastewater a Valuable Resource?

Depending on the waste stream composition Titan Salt strives to make a difference, always looking for opportunities to produce a valuable product from your waste stream. We use our extensive knowledge from the salt industry to design a state-of-the-art, highly integrated ZLD system that has the possibility to extract several valuable products in one system. Whether it is chemicals that can be reused or if it is a product that is saleable, Titan Salt has the expertise to help you solve this problem and create money out of waste.

Recovered products such as:

- ✓ NaCl
- ✓ Na₂SO₄
- ✓ KCl
- ✓ K₂SO₄
- ✓ CaCl₂
- ✓ Etc.



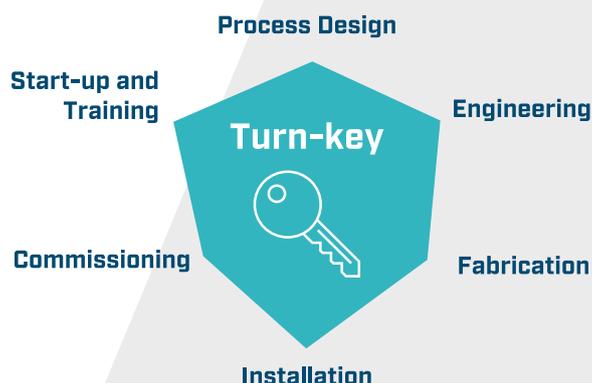
Hybrid ZLD Systems

In a perfect scenario, waste streams which need to be treated enter into an evaporator / crystallizer system at or near saturation for the given solute. Unfortunately, a lot of waste water streams are very dilute and profoundly undersaturated which increases the operational energy cost in order to evaporate off the additional water load. Titan Salt utilizes pre-concentrator technology such as reverse osmosis (RO) and high pressure reverse osmosis (HPRO) to concentrate the waste water stream to a higher total dissolved solids concentration and therefore reducing the amount of evaporation load on the downstream system.

To further recover the remaining water and to fully precipitate out all of the dissolved solids, further concentration and crystallization is achieved in falling film (FF) evaporators and forced circulation crystallizer, respectively. When the recovery of valuable make-up chemicals or by-products is desired, Titan Salt utilizes various technologies, upstream of the evaporation systems, such as: chemical pretreatment for softening, backpulse filtration for removal of fine particles, or hydrocyclones for hydrocarbon separation. Each system has its unique waste water composition which therefore may require a combination of technologies to get the job done which is why we strive to develop the most ideal hybrid ZLD systems.

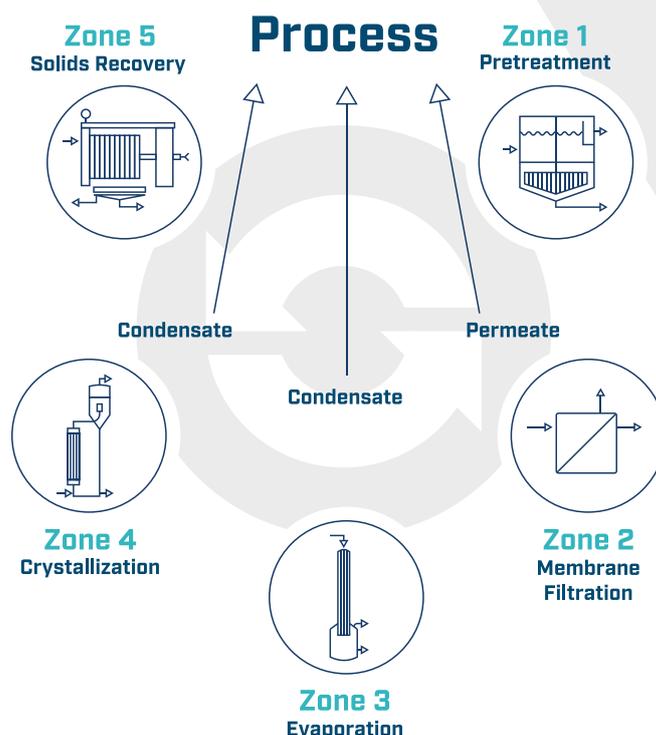
Reduce, Recycle and Recover!

In certain cases, a full zero liquid discharge process may not be necessary. At times, removal or reduction of certain contaminants from the process / purge stream is all that is necessary to meet the environmental requirements. Similar, for certain applications, through various technologies, systems can be designed to remove contaminants from the waste streams and therefore allow for the recovery of valuable product, such as KCl, or recover of necessary make-up chemicals which are required to drive your process. Reducing the amount of waste exiting your facility reduces the environmental impact and potentially recovers costly make-up chemicals but with the added benefit of a reduced capital cost versus a full scale ZLD system. Options such as these are more economical for the customer and allows for a shorter return of investment!



Analyzing and Testing

We are able to analyze and test your samples. Titan Salt continually seeks to develop the latest technologies for our customers. We utilize various softwares, pilot skids, and our knowledgeable staff to do so. Titan Salt's research and development has a broad focus for improvement in areas such as: metallurgy, welding, manufacturing, process design and operation. This dedication allows our customers to receive energy efficient, cost effective, and low maintenance solutions.





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