

Industrial Wastewater Recycle and Zero Liquid Discharge (ZLD)

With GPT's Sustainable Brine Shrinker (SBS®) based on Forward Osmosis Technology



Advanced Membrane-Based Technology



Less Investment and Operations Costs



Wastewater Recycle & Reuse



Wide Applicability



High Operational Efficiency

- Industrial wastewater often contains high levels of contaminants with complex nature
- GPT's patented SBS® system can be efficiently used to treat, recycle, and reuse wastewater
- More than 70% of wastewater recovery
- 50% reduction in O&M costs, 30% savings in capital investment

- Less pressure operation giving low energy consumption
- Modular, integrated and simple plant operation
- Easy retrofit to existing plants
- Minimal chemical use due to low fouling and scaling issues

A SUSTAINABLE SOLUTION

The industries often generate effluent with high amounts of TDS, TSS and COD. Therefore, it is extremely important to adopt new technologies to effectively treat and recycle the effluent to meet strict environmental standards and achieve water sustainability.

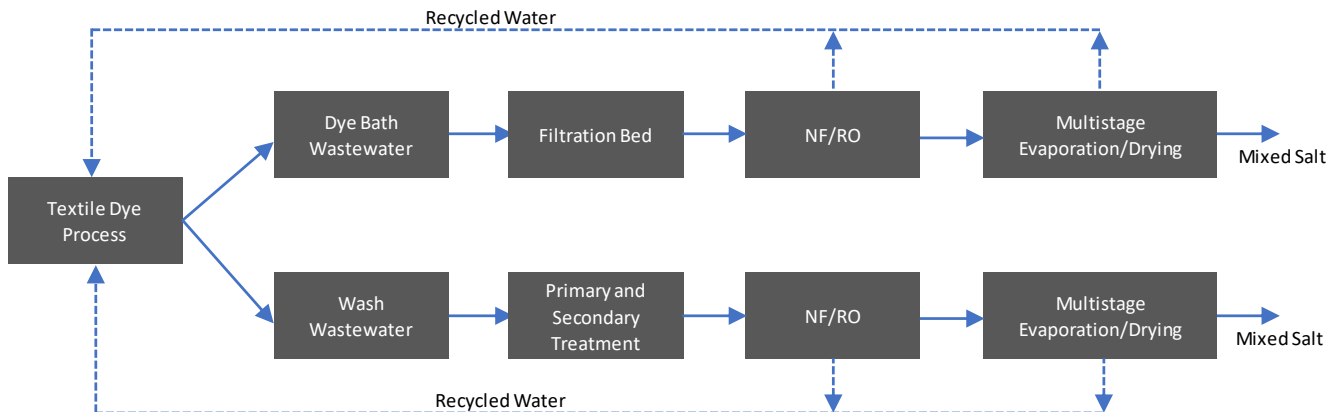
Conventional treatment technologies consist of multiple stages of pretreatment, Reverse Osmosis, Evaporator and Crystallization system.

Traditional technologies require high operational footprint, high capital and operational costs. Additionally, they are difficult to maintain and gives overall high cost of ownership.

GPT's patented SBS® system is based on Forward Osmosis (FO) technology which offers multitude of advantages of low energy consumption, less fouling, less chemical use while providing more than 70% water recovery.

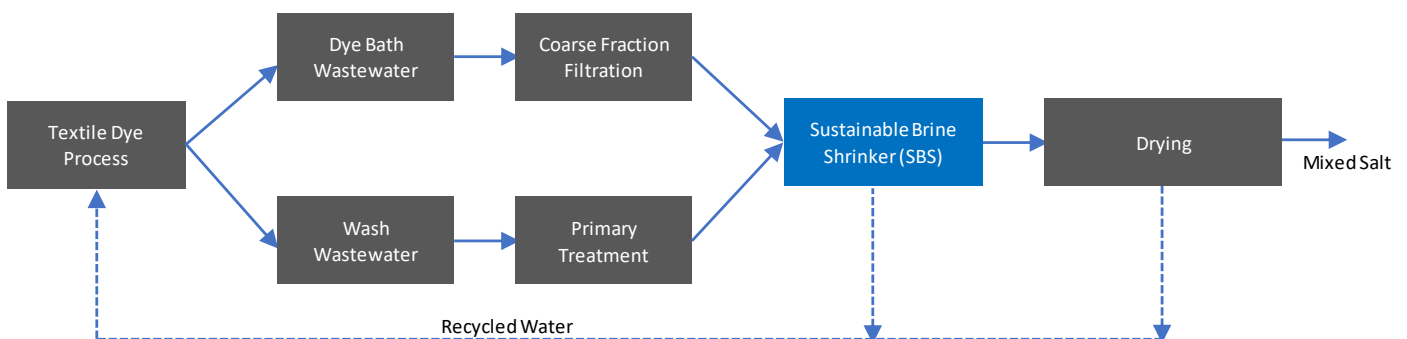
Case Study- Textile Industry

Traditional Approach



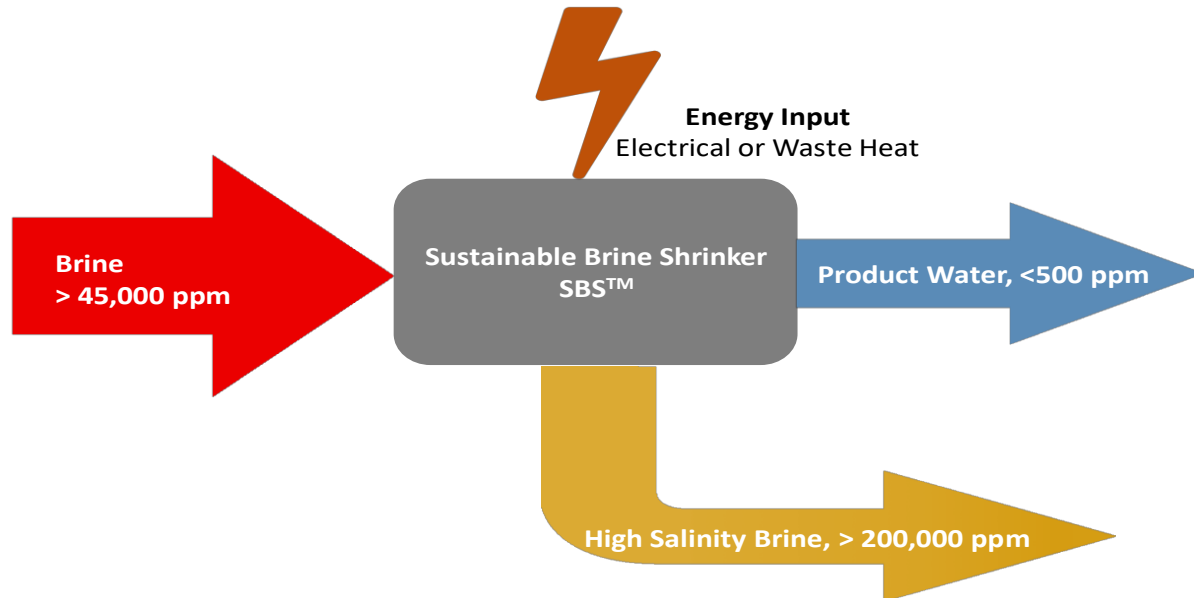
- Traditional process requires multistage primary, secondary and energy consuming NF/RO process
- Evaporation and drying stage consume enormous amount of energy and maintenance giving high cost of ownership
- High pressure NF/RO results in loss of dyes and salts

Our Approach : Sustainable Brine Shrinker (SBS®) System



- 3x or 4x concentration factor achieved by reducing brine volume significantly- giving lower evaporation load and higher steam savings
- Able to treat and recover wastewater from 2-stage RO concentrate, further achieving brine reduction and reducing the load on Multi-Stage Evaporator (MEE)
- Low energy usage, less fouling and scaling and high-water recovery giving overall economical unit cost of water recovery
- Excellent product water quality compared to conventional system
- Highly sustainable technological solution

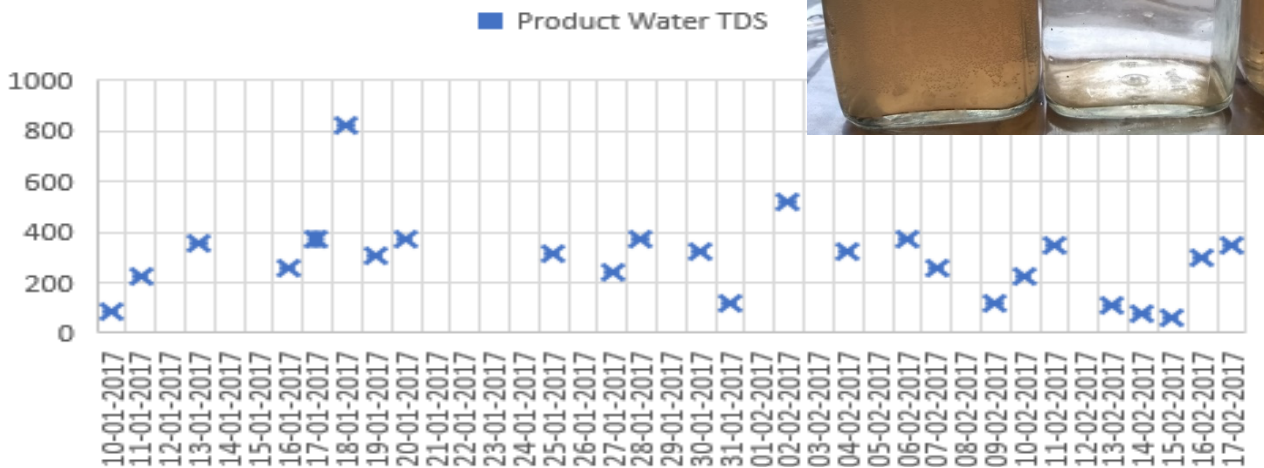
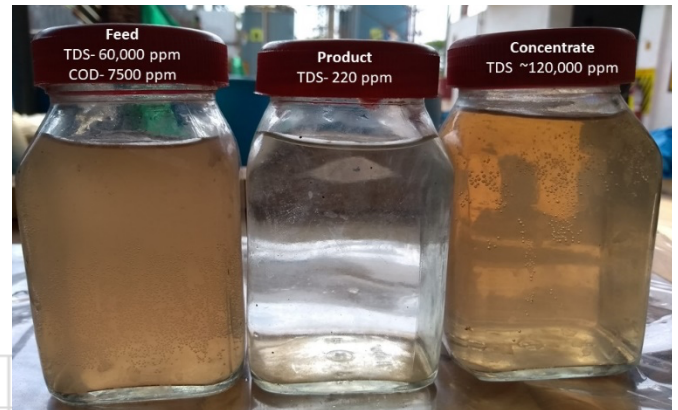
Sustainable SBS® Process



Parameter	SBS – Fully Electrical	SBS- with Thermal Heat
Concentration Factor	2	3-4
Max Reject Concentration, ppm	120,000	250,000
Electricity Usage, kWh/m3	9-12	3-5
Recovery	50%	75%
Heat, MJ/m3	-	130
Fouling	Moderate	Low
Draw Recovery	RO or NF	MD
Water Cost, Rs/m3	35	48 [Fuel Fired] 23 [with Waste Heat]

- Available in a prefabricated and factory tested ISO container size, fully or semi-automatic configuration, in built CIP, dosing and cleaning setup, PLC SCADA enabled skid

Outcome



Consistently good quality product water

Industrial textile wastewater was treated successfully with hybrid FO technology to concentrate brine up to 3 concentration factor and obtained product water consistently of <500 ppm TDS. The outcome resulted in successful implementation of 100 m³/day of commercial plant.

About GreenPebble Technologies LLP

GPT is an innovation-driven water and wastewater treatment solutions provider focusing on brine management, sea water desalination, Zero Liquid Discharge (ZLD) and water recycle/reuse applications.

GPT holds multiple global patents on various novel membrane-based technologies that gives economical, efficient and sustainable water treatment solutions.

GPT provides prefabricated and factory tested containerized plants that can be easily deployed and commissioned even at remote locations. The standard plant capacities range from 10-500 m³/day flow.

Our solutions are easily customized for various industries including chemicals, textile, pharma, mining, food & beverage, dairy, hospitality sector.

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