GreenPebble Technologies

Your Water and Energy Solutions

SEPION®

Advance Forward Osmosis Membrane for Dewatering Applications

GreenPebble Technologies LLP (GPT) develops advanced membranes and membrane processes for wastewater treatment, sea water desalination, zero liquid discharge, resource recovery applications.

GPT's primary focus area is to design and manufacture membrane systems that delivers on sustainability. Our wide range of products and services will be able to cater the ever-growing needs of industries to improve product quality, efficiency, cost, and safety.

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SEPION® Forward Osmosis (FO) Membrane

Forward Osmosis is a naturally occurring osmotic membrane process when different streams of different concentrations are separated by semi-permeable membrane. Due to its fundamentally different approach, FO process utilizes extremely low energy without the need to apply any additional driving forces such as high temperature or high pressure.

GPT is introducing SEPION® Forward Osmosis (FO) membrane to enable end-users to achieve various goals of product dewatering, separation, fractionation, or enrichment.

GPT's SEPION® is thin film composite (TFC) membrane giving excellent water flux, high salt rejection and minimized reverse solute flux.

Additionally, they offer benefits as mentioned below:

- It can achieve high reject concentrations compared to RO system helping to achieve ZLD goals
- It offers maximum tolerance towards scaling or fouling precursors
- It utilizes minimum chemicals for regular membrane operations.
- Due to its moderate operating conditions, it preserves heat or pressure sensitive natural components in food, beverage, pharmaceuticals, and biotechnology products.
- It is less prone to membrane scaling and fouling which requires minimized pretreatment and cleaning cycle
- High membrane life and overall, less life-cycle costs

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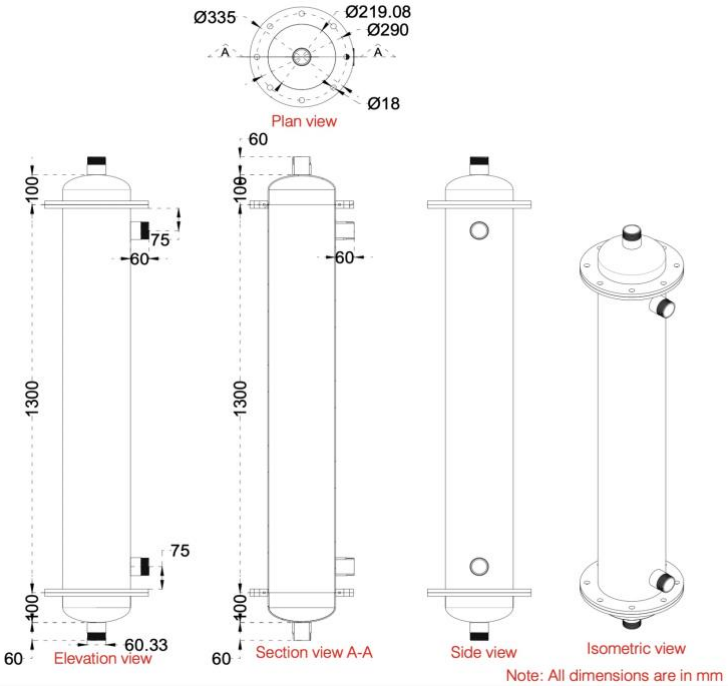

*(*specifications for 65 m² module)*

Technical Specifications

Membrane Area (m²)	1.2	14	65
Water Flux*, L/m²/hr	17-20		
Fiber OD and ID (mm)	1.0 and 0.6 resp.		
Reverse Solute Draw Flux*	0.1-0.15 g/L		
Membrane Configuration	Hollow Fiber		

*for raw/tap water (TDS <500ppm) as feed and 35000 mg/L NaCl as draw solution

Recommended Operating Conditions

pH Range	3-11
Temperature Range	5-45°C
Feed Flow	1.0-1.8 m³/hr
Draw Flow	0.5-1.0 m³/hr
Transmembrane Pressure (TMP)	0.2 bar
Flow Direction	Counter-current
Maximum Allowable Pressure	3 bar
Free Chlorine Tolerance	<0.001 mg/L

Above details are only for information purpose, and it cannot be used for guarantee or warrantee purposes.

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Module Operation Guide

- It is recommended to install a 5-micron prefilter at the inlet of feed and draw solution before injecting fluids into the module.
- The maximum feed pressure should not be more than 3 bar.
- Before use, rinse or flush the membrane element with demineralized water on both the lumen side and shell side for at least 15 min. Keep all ports open during flushing.
- Maintain TMP of lumen-to-shell maximum at 0.2 bar.
- After first use, never keep the membrane dry for more than 36 hours and always keep it in a wet condition. If not in use, use 0.2% w/w of SMBS solution as a preservative to prevent fouling, depositing etc. Rinse thoroughly with clean water before reuse.
- The membrane cleaning should be done with 2% w/w citric acid followed by 0.1% w/w NaOH solution at a pH of 13 for at least 30 mins cycles each.
- Always rinse the membrane element with clean water after each operation or cleaning cycle.
- Never operate membrane elements at temperatures higher than 45°C.
- Keep the membrane module in a roofed, well-ventilated space.
- Do not allow oxidizing chemicals such as free chlorine, hydrogen peroxide, sodium hypochlorite etc. in direct contact with membrane elements.
- Do not apply direct load on the membrane module, or temper the end caps, membrane housing or connections. Use proper size process connections and piping.
- Record all observations in a logbook

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