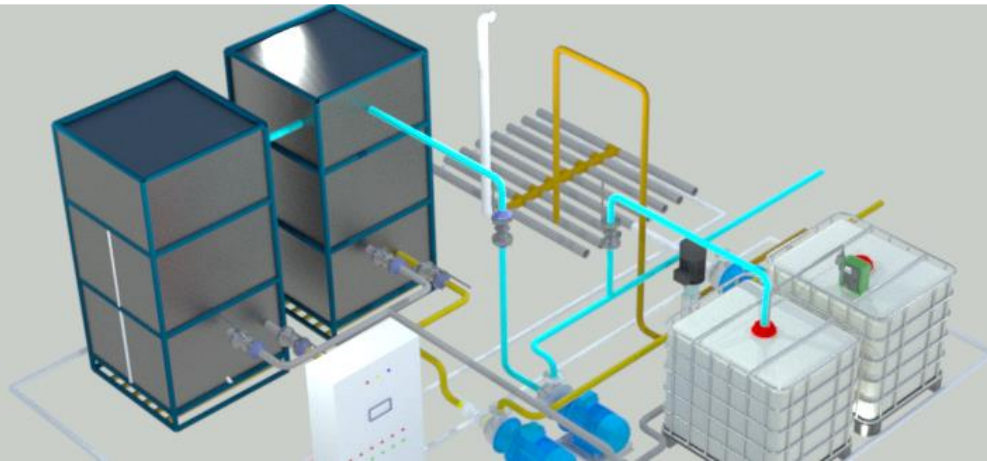


# GreenPebble Technologies

Your Water and Energy Solutions

## Membrane Bioreactor (MBR) Module

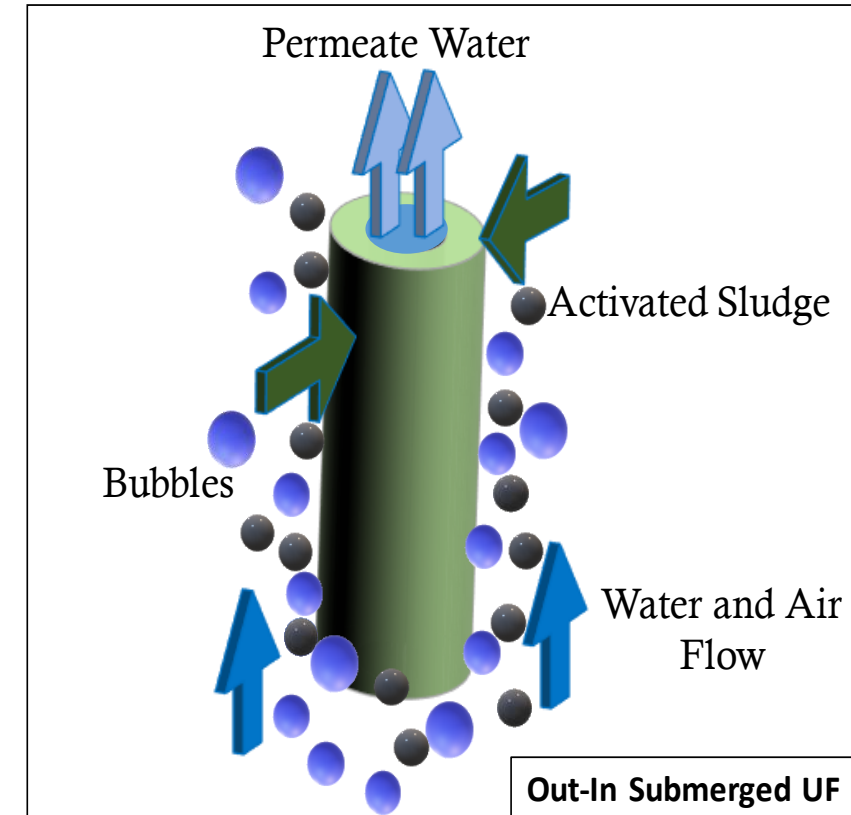
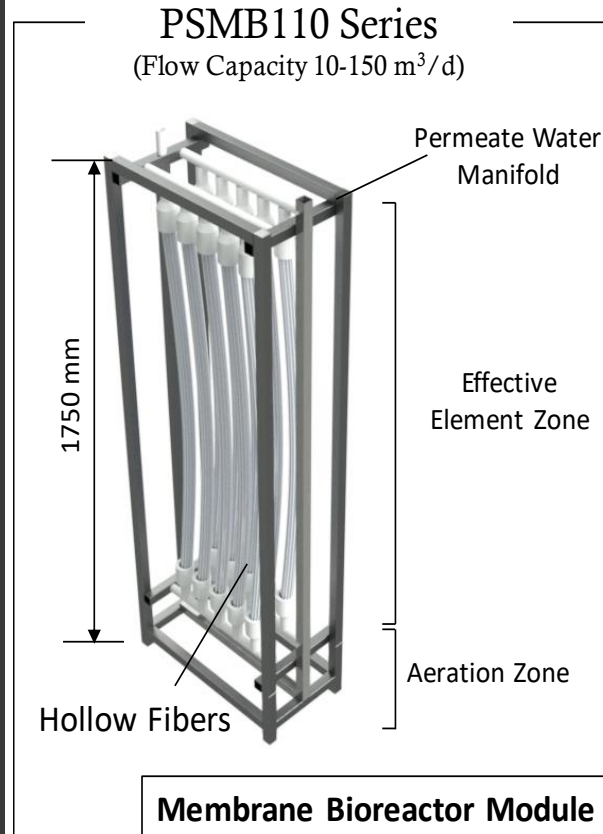
## Sewage Treatment Plant with MBR Technology



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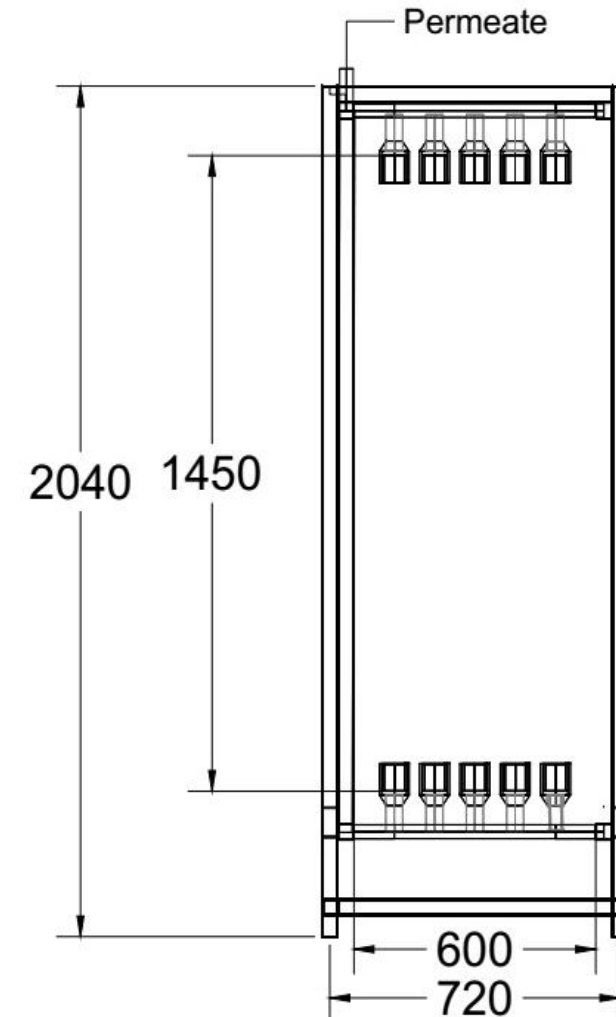
# Membrane Bioreactor

- GreenPebble Technologies manufactures and implements patented MBR hollow fiber membranes and modules
- The unique feature of this hollow fiber membrane is its different structured layers which increases its surface area resulting in high water flux and easy cleaning procedure.
- Consistent and high product water recovery (>90 %).
- Out-In operation mode filters out high Mw substances, suspended particles and colloidal elements and product water is recovered
- Removal up to 100 kDa components
- The technology is highly energy efficient and easily adapts to load Variations.



# MBR module Specification

Industry	Chemical, Oil & Gas, Pharma, Automobile, Hospitality, Textile, Food, Leather, Dairy, Biotech
Brand	Permeara Solutions
Condition	New
Inlet Flow Rate (cubic meter/hour)	10-300 m <sup>3</sup> /day
Material of Construction	Reinforced PVDF or Modified PES
Module Overall Dimensions (LxBxH) in mm	720 x 400 x 2040, 440 x 150 x 1020
Applications	Sewage Treatment, Effluent Treatment, Waste Water Treatment, Water Purification for Drinking, Water Recycle and Reuse
Water Source	Bore well Water, River Water, Industrial Effluent, Industrial Wastewater, Municipal Sewage, Commercial Waste Water
Capacity	10-500 m <sup>3</sup> /day
Module Membrane Area	5 m <sup>2</sup> ,10 m <sup>2</sup> ,20 m <sup>2</sup>
Filtration Method	Negative Suction Pressure
Working Temperature	5-45 °C
Designed Membrane Flow	30-85 L/m <sup>2</sup> /hr
Membrane maintenance	Replacement every 3-5 Years



# Features

- New generation Reinforced PVDF membrane with high hydrophilicity and rejection rate
- Consistent pore size distribution enabling less fouling tendency, promotes operational flux and increase membrane life
- Incorporates anti-fouling agents within pore structures
- Average membrane pore size of 0.05  $\mu\text{m}$  which removes suspended solids, pathogens, colloids etc
- High mechanical tensile strength and high peeling-off strength
- Easy cleaning and high chemical tolerance
- Dry membrane element with easy module transport and storage

# Application Conditions

Conditions	Parameter	Value
<b>Feed Condition</b>	Turbidity	<300 NTU
	pH	2-10
	Temperature	1-45 degC
	Prefiltration	100-300 um
<b>Design Flux</b>		30-120 LMH @ 25 degC
<b>Max TMP</b>		0.2 Mpa
<b>Backwash Condition</b>	Frequency	10-60 min/time
	Max TMP	<0.2 MPa
	Flux	80-120 LMH
<b>Air Cleaning</b>	Inlet Pressure	<0.25MPa
	Air Scour Flux	4-10 Nm <sup>3</sup> /hr/pc
<b>Chemical Enhanced Backwash</b>	Frequency	Adjust according to water quality
	Cleaning Solution	0.1% HCl, 0.05% NaOH + 0.1% NaClO (adjust as needed)
<b>CIP</b>	Frequency	When filtration TMP is >0.08 MPa
	Chemical Solution	1-2% Citric acid, 0.1% NaOH+0.2%NaClO

# Sewage Treatment Plant with MBR Technology

Decentralized Sewage Treatment Plant is based on Membrane Bioreactor (MBR) technology

MBR is submerged type UF membrane in hollow fiber configuration

It smartly integrates aeration with biological reactor for effluent treatment. It significantly improves operational effectiveness and reduces space requirement

GreenPebble Technologies' MBR system utilizes Polyethersulfone (PES) or PVDF hollow fiber membranes

MBR modules breaks down organic substances in wastewater and filters out product water

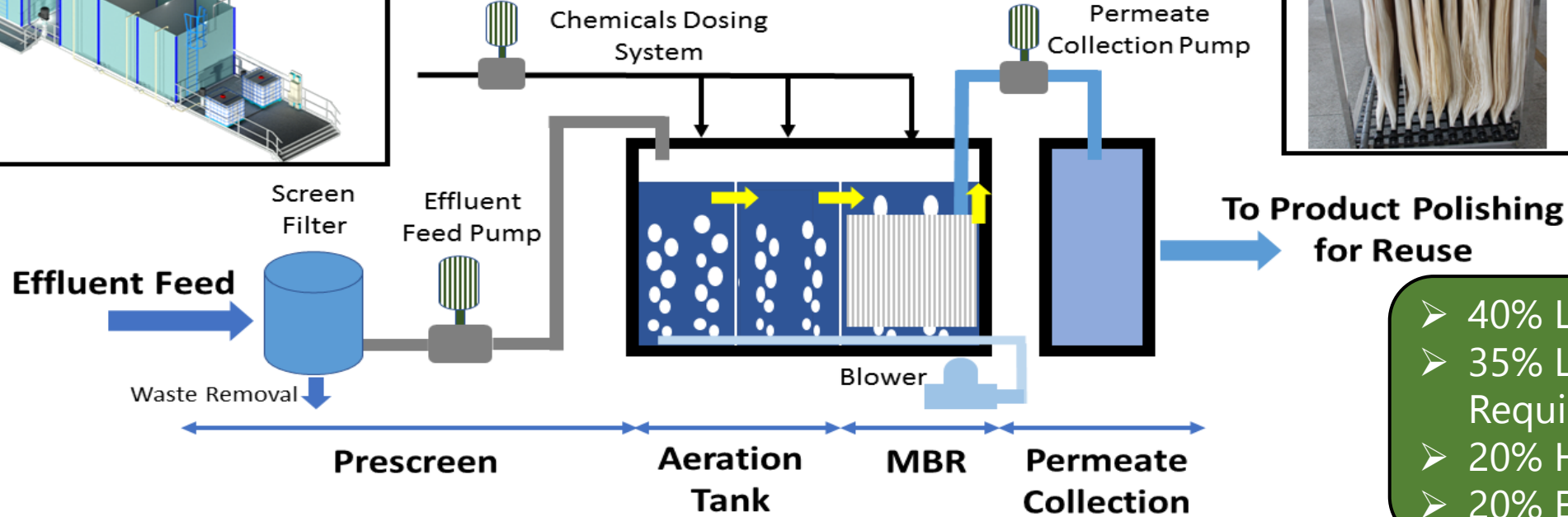
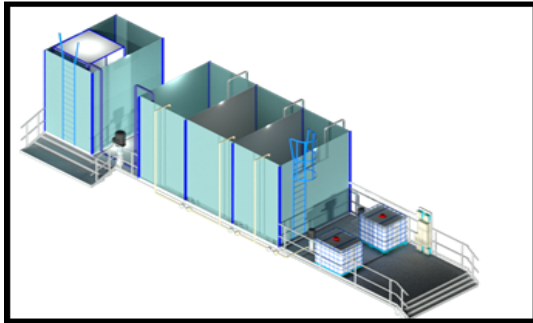
# Basic Features of MBR based STP

Simple Treatment Process

Robust and Reliable Operation

Modular Framework

High Water Flux with Excellent Product Quality



- 40% Less Maintenance
- 35% Less Space Requirement
- 20% High Water Recovery
- 20% Economical

Compact and integrated design eliminates the need for separate, space and resource consuming aerator and biological reactor

# Membrane Bioreactor

## Features

- Economical & easy to operate
- Sustainable
- Modular & Scalable
- Compact & Modular design
- Plug & Play
- Longer Membrane Life
- Less Maintenance
- High Water Recovery
- Less Energy Usage

## Applications

- Industrial waste water treatment
- Municipal waste water treatment
- Wastewater recycling and reuse
- Pretreatment filtration for RO or NF
- Decentralized Sewage Treatment Plant



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