

# IGS MBR SYSTEM

Advanced Membrane Filtration For Wastewater  
Treatment

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## A ROBUST WATER TREATMENT DESIGNED TO REDUCE MAINTENANCE

MBR (Membrane Bio-Reactor) units are a robust wastewater treatment process with inherent features designed to reduce maintenance and provide reliable and efficient wastewater treatment for small and medium scale applications.

MBR is a new wastewater treatment technology, which combines biological treatment with membrane separation.

In conventional activated sludge processes, the separation of the treated water from the sludge is mainly achieved by sedimentation in the secondary clarification tank. This requires a considerable amount of space and capital cost, and the separation efficiency is low.

### **Domestic wastewater treatment / Greywater recycling:**

High treatment efficiency, high effluent quality, and  
Permeate – free of suspended solids

### **Industrial wastewater treatment:**

Suitable for landfill leachate, high BOD food processing, livestock, chemical, pulp, and paper wastewater.

**Water reuse or recycling:** Direct reuse or purified with reverse osmosis

## Advanced Membrane Filtration for Wastewater Treatment

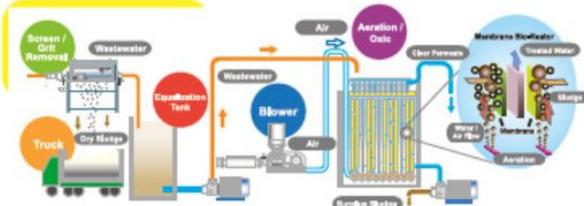
Low-Energy Submerged Hollow Fiber Ultrafiltration



## How does it work?

Using membrane to replace the secondary clarification tank, suspended solids can be completely removed from treated water, resulting in a high effluent quality. It not only concentrates slow-growing bacteria, but also retains large molecular organic compounds in the reactor, thereby increasing contact time with the sludge. Therefore the removal rate of COD, BOD, nitrogen and phosphorus will be greatly increased.

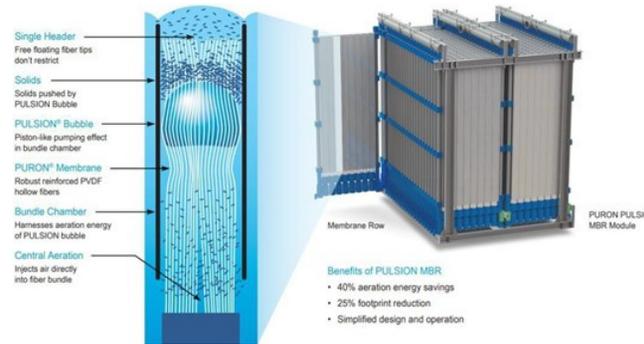
### The Process



## Background:

During sales activities, IGS approached Solari to explore the provision of MBR systems suited for sale through their customer Netforce, based in Manila, Philippines. Initial discussions occurred between IGS and Solari and then between Solari, IGS, and Netforce as a team. This proposal has come from the initial and subsequent work on this system.

## IGS Water Science



## Packaged MBR Systems

KSS pre-engineered systems feature comprehensive, complete packaged MBR systems for flow rates up to 250,000 GPD (950 m<sup>3</sup>/day). This system is designed to treat municipal and industrial water and wastewater for a variety of applications, including food, beverage, dairy, leachate, and produced water. Benefiting from the robust PURON hollow fiber membrane and a comprehensive biological system, these systems can reduce BOD and nitrogen concentrations down to 5 and 10 mg/L, respectively.

## Advantages of MBR Technology

IGS MBR pulses a large bubble through a chambered fibre bundle creating a highly efficient piston-like pumping action resulting in lower air and aeration energy requirements than traditional air scours methods. This innovative product can harness the aeration energy utilizing the unique single header and central aeration design of the PURON membrane module.

Improved recirculation of mixed liquor within the membrane module, not only results in lowered air requirements but also boosts achievable fluxes. Optimized module design and flexible system layout options reduce membrane tank sizing. The combination of greater productivity, increase in packing density along a streamlined system configuration allows the overall system footprint to be significantly reduced.

Operating with a continuous supply of air eliminates the need for air cycle valves. A reduced airflow rate applied to the membranes continuously instead of high air flows applied cyclically reduces the size of the air delivery equipment by 50%. This simplified blower arrangement and train configuration further reduce equipment and engineering costs associated with the design, construction, and operation of PULSION MBR systems.

The plant is semi-automated and has the option of remote data monitoring of the vital functions to operate with a proactive not reactive operator maintenance requirement. There can be alarms by SMS and email set up to notify low medium and high priority events.

**EFFLUENT QUALITY SUPERIOR TO  
CONVENTIONAL TREATMENT  
TECHNOLOGY.**



## HISTORY, BENEFITS AND ADVANTAGES OF AKVOTEK WATER SCIENCE (KOCH) MBR TECHNOLOGY:

### Over 50 Years of Membrane Experience

Koch Separation Solutions (KSS) is a global leader in membrane filtration technologies with over 50 years of membrane experience and thousands of system installations worldwide. The PULSION® MBR is the next-generation PURON® MBR, featuring reduced energy requirements, a smaller footprint, and a simplified design and operation. Suited for both municipal and industrial water and wastewater applications, the PULSION MBR is our cost-effective, compact, and automated solution.

### PURON Membrane

The uniquely designed PURON membrane is a 0.03 micron reinforced PVDF ultrafiltration membrane that acts as an excellent barrier to suspended solids, bacteria, and other pathogens. The narrow pore size distribution ensures high permeability and sustainable, uninterrupted operation with reduced maintenance and cleaning requirements.

### PULSION MBR Module

The PULSION MBR ultrafiltration system features our unique single-header design where fibers are fixed only on the bottom and can float freely to eliminate clogging and buildup. Additionally, the PULSION MBR introduces an innovative and patented air scour method. A large air bubble is pulsed through the chambered fiber bundle, creating a highly efficient piston-like pumping action. This unique design results in up to 40% lower air and aeration energy requirements than traditional air scour methods. Improved recirculation of mixed liquor within the membrane module not only results in lowered air requirements but also boosts achievable fluxes. Optimized module design and flexible system layout options reduce membrane tank sizing.

The combination of greater productivity increased packing density, and a streamlined system configuration allows the overall system footprint to be significantly reduced.

## Case Study 1

### Largest Bakery in Hong Kong

The largest bakery plant in Hong Kong recently adopted Dunwell Membrane Bio-reactor (DMBR) to treat the mixed wastewater generated from their production lines and sanitary facilities. Compared to their existing wastewater treatment plant, DMBR helps the bakery plant to save Hong Kong (HK) \$240,000 per year. In addition to the annual saving, the existing wastewater treatment plant can be totally removed from the existing location, and the free space could be used as another function such as a warehouse or production floor.

The treatment plant consists of three parts: mechanical pre-treatment, the biological step and the filtration by submerged MBR membrane. After removal of the coarse particles from the wastewater by means of two automatically self-cleansing bar screens, the wastewater is fed into the aeration zone of the plant. The bacteria inside the aeration zone will digest the organic pollutants and become numerous bio-flocs (activated sludge) suspending inside the aeration zone. The biologically cleaned water will be separated from the activated sludge by the submerged membrane. With the pore size less than 1.4 micrometer on the membrane surface, no bacteria is able to pass through the membrane surface and enter the treated water stream.



## Case Study 2

### Hotel Greywater / Blackwater Recycling

The latest 6 star-serviced hotel in Macau recently adopted Dunwell's MBR (DMBR) to recycle the grey water collected from their luxury rooms. The recycled greywater will be re-used for toilet flushing and irrigation purposes. Similar to the areas with limited fresh water supply, Macau's fresh water is expensive and scarce. With the adoption of DMBR, the cost of fresh water is saved up to about 50%.

The treatment plant consists of three parts: mechanical pre-treatment, biological step, and filtration by submerged MBR membrane. After removal of the coarse particles from the wastewater by means of an automatically self-cleansing bar screen, the wastewater is fed into the aeration zone of the plant. The bacteria inside the aeration zone will digest the organic pollutants, and become numerous bio-flocs (activated sludge) suspending inside the aeration zone. The biologically cleaned water will be separated from the activated sludge by the submerged membrane. With the pore size less than 0.14 micrometer on the membrane surface, no bacteria can pass through the membrane surface and enter the treated water stream.

