Advantages of Membrane BioReactor Systems (MBR)

Conventional systems are generally regarded as process which adopt gravity separation or clarification as a means of generating the secondary treatment standard.

Such process would generally fall into two categories, Activated Sludge Systems (ASP) or Sequential Batch Reactors (SBR).

The environmental regulations relating to the discharge of treated waste waters coupled with the stringent standards you demand for water re-use requires your effluent plant to operate at a standard not easily met by conventional means due to its reliance on gravity settlement followed by sand filtration, both process elements known for their fragility and unreliability.

MBR overcomes these operational problems and at the same time generates effluent standards not attainable by conventional means.

Below are a number of principle benefits of the MBR Process:-

Smaller Footprint.

Large clarifiers no longer are needed. A smaller often rectangular shaped tank housing the membrane modules replaces the clarifier whose size is governed by the flow and operating mixed liquor level of the aeration tank.

The MBR system does not require the activated sludge flocs to be formed in the bioreactor needed for removal by settlement and therefore the concentration of bacteria in the bioreactor, called the “biomass” can operate at very high levels of MLSS (mixed Liquor Suspended Solids), generally in the order of 12,000-18,000 mg/l, and as high as 22,000 mg/l.

Therefore compared with a conventional system which has to operate at circa 3,500-5,000 mg/l its physical size is proportionally smaller, i.e. the volume of the bioreactor will be one third of the operating volume.

Versatility, our bioreactors are sized to operate at a MLSS of 10,000mg/l, and so having the ability to operate them consistently at 15,000-18,000mg/l means that proportional increases in COD/BOD loads can be tolerated and treated, i.e. circa 50% spare treatment capacity for when seasonal variances occur in crop and production.

Effluent Quality.

Improved effluent quality because the biomass, including entrapped and adsorbed inorganic and organic micro-pollutants, pathogens, viruses and macromolecules are completely retained in the biological system and are subjected to a longer treatment time, this advantage may be very important in view of the more stringent effluent quality imposed by EU regulations taking effect in the near future.

This advantage of an improved effluent quality is even more obvious for treated wastewaters being reused in food related processes.

Lower Sludge Disposal Costs.

Operating the bioreactor at these high concentrations creates a long sludge age, which substantially reduces the quantity of sludge wasted out of the system which has to be removed from site.

Ultrafiltration means NO Sand filter.

The **Mitsubishi Steropore™** Hollow Fibre Membrane has a porosity of 0.4µ which being smaller than the bacterial floc size generates an effluent of zero solids, this cannot be matched by a conventional settlement tank even when followed by sand filtration which will typically capture solids in excess of 30-50µ to give 15mg/l.

The combination of excluding sand filters from the system, and having a zero solids in the treated effluent has many process and operational advantages, firstly the total treatment volumes are minimised as no sand filter backwash waters will be generated, secondly the life expectancy of the activated carbon will be much higher as the solids passed by sand filters will present an organic load which will be up taken by the activated carbon thus decreasing its life expectancy.

Zero solids means UV disinfection will not be required as UV is designed to kill particulate microbial elements.

Simpler Operation.

Because the final effluent quality is achieved by mechanical filtration, monitored by membrane pressures and controlled by a PLC there is no necessity for carrying out Sludge Volume Index tests, which would have to be done daily for conventional systems.

Peace of Mind.

The objective of 100% success on all projects pledged by RWB/Mitsubishi gives unrivalled security.

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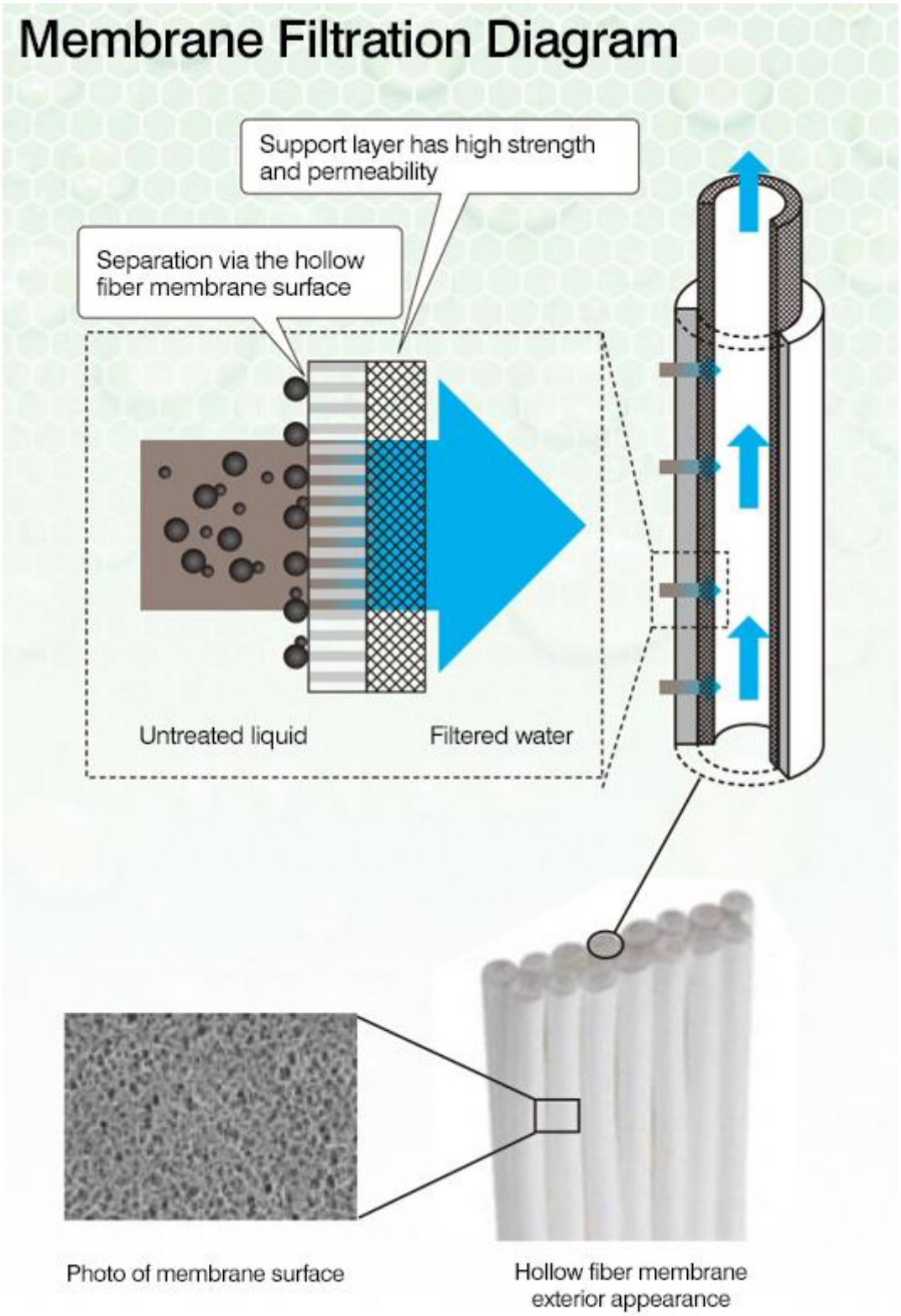
Membrane Filtration Diagram



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Membrane Module

Membrane Element

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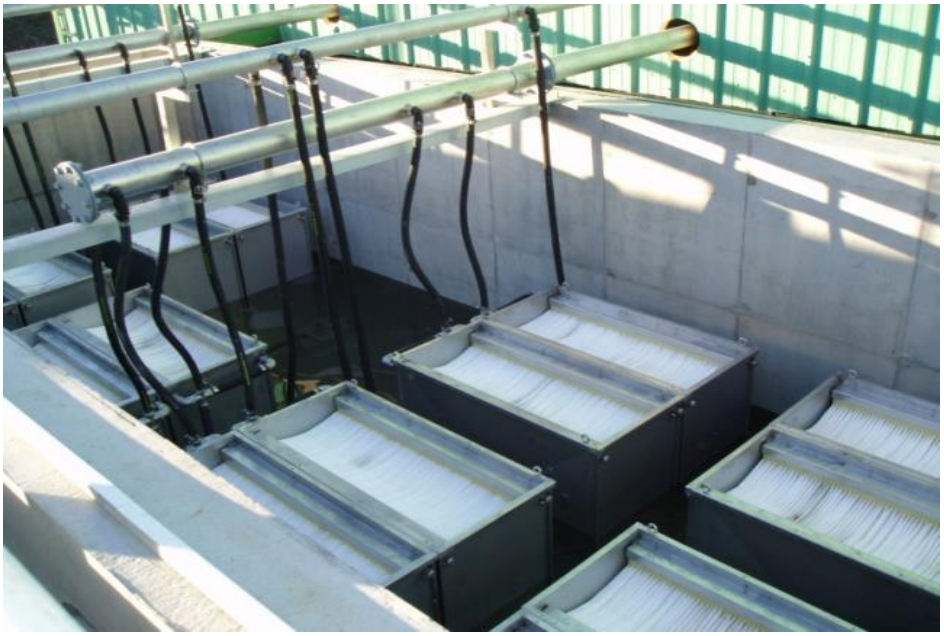

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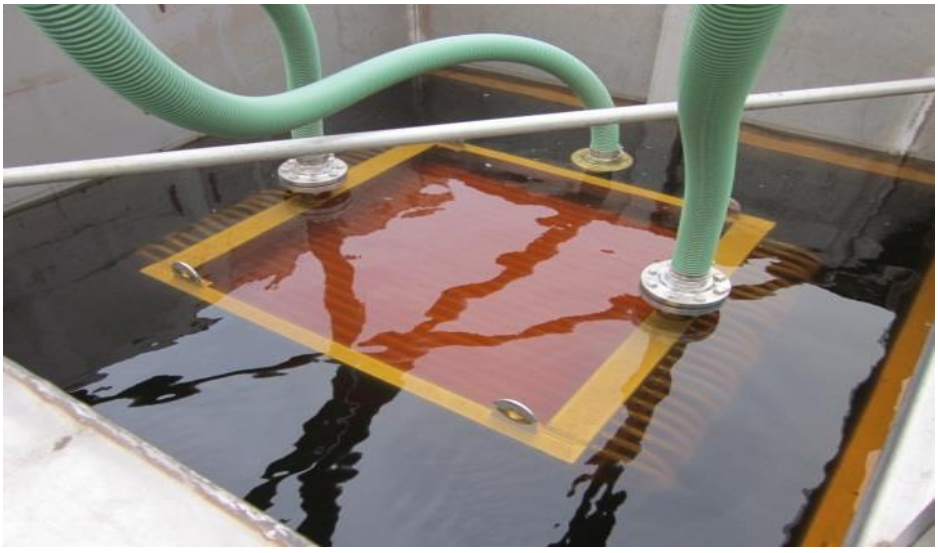

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