ITT

Aquious - PCI Membranes

The Dual Stage MBR

The ITT Dual Stage Membrane Bioreactor (MBR) was created to provide industrial and municipal customers with a technologically advanced, economical solution to their wastewater treatment needs. In the interests of minimising whole life costs and maximising performance, a unique and innovative design approach is taken - separating biological treatment and membrane filtration into two distinct zones. This allows each stage of the process to be optimised individually, enabling operating conditions such as aeration rate to be controlled discretely for each stage to minimise cleaning and power costs. Furthermore, the flexibility this provides allows standard designs to be tailored to suit the specific requirements of particular industrial wastewater types.

The intensive nature of the biological treatment stage combined with the filtration barrier provided by the membrane stage makes the system robust and surprisingly simple to operate, enabling the process to tolerate fluctuations in influent quality. A very high quality of effluent is produced that is suitable for on site reuse or direct discharge to sensitive receiving waters. It is also highly suited to polishing processes, such as ITT's range of Reverse Osmosis systems, which are able to purify water to almost any standard required. Systems can be provided either as standard packages or bespoke designs to suit the nature of the wastewater and integration into existing site infrastructure.

- Lowest whole life cost MBR system
- Optimal operating conditions in separated biological and filtration stages
- Consistently high quality effluent suitable for reuse or direct discharge
- Intensive process providing resilience and minimal footprint requirements
- Available in standard packages or bespoke designs for integration into existing infrastructure where increased capacity and/or quality is needed
- Incorporates market leading, high efficiency SANITAIRE® fine bubble diffusers
- Simple, undemanding operational and maintenance requirements
- Capable of biological nutrient removal
- Lower sludge production than conventional activated sludge processes
- Modular design providing process flexibility - suited to a wide range of effluents
- Multiple, integrated cleaning techniques to maximise performance - regimes can be optimised to suit specific effluent characteristics

Engineered for life

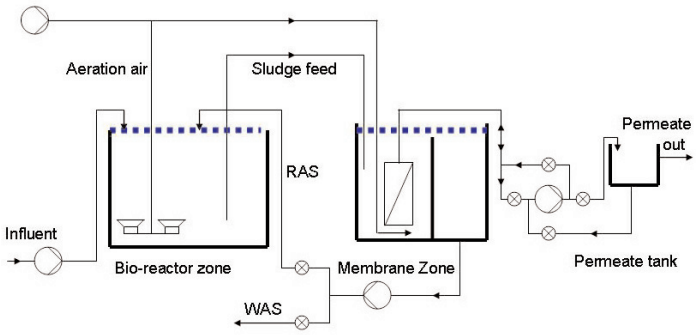
Efficient, High Rate Biological Treatment

High efficiency SANITAIRE® diffused aeration technology is incorporated into the biological stage of the ITT Dual Stage Membrane Bioreactor. The air supply to this stage is separate from that serving the air scouring system in the filtration stage, enabling each to be controlled and optimised separately, thus reducing the power demand. The use of membrane filtration as opposed to gravity settlement for clarification allows the activated sludge process to be considerably more intensive than is possible with conventional processes. This provides resilience to changes in influent quality and also considerably reduces the overall plant footprint required. Importantly it also reduces the amount of waste sludge that is produced. For customers needing to reduce the concentration of nitrogen species and phosphorous, an anoxic zone can be incorporated to provide biological nutrient removal.

Advanced Membrane Filtration

Reinforced, submerged hollow fibre membranes are employed in the filtration stage to separate purified effluent from waste compounds, providing effluent of a very high quality. The unique design of these membranes incorporates braiding to significantly improve the membranes' ability to withstand the harsh operating environment of a Membrane Bioreactor, and thus increase their lifespan. The membranes are mounted in proprietary modules that provide the optimal degree of restraint and system robustness.

High Quality Effluent	
BOD5	<2mg/l
TSS	<1mg/l
Ammonia	<1mg/l
Total Nitrogen	<3mg/l*
Total Phosphorous	<0.1mg/l**
Turbidity	<0.2 NTU
NB. * with anoxic zone	** with coagulant



Advanced Cleaning Techniques

The high concentration of biomass within an MBR creates a challenging environment for efficient filtration. The ITT Dual Stage Membrane Bioreactor therefore incorporates various cleaning techniques to minimise the build up of material upon the membrane surface and therefore maintain optimum performance. This reduces operating costs and the need for aggressive chemical cleaning of the membranes, thus extending their life.

- The dual stage concept allows the hydraulic design of the filtration stage to be based on membrane cross flow, which increases turbulence at the filtration surface.
- Periodic backwashing of membrane modules using permeate can be undertaken whilst the system is in operation, which dislodges fouling material from membrane surfaces.

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