

TRITECH SOLUTIONS FOR MBR APPLICATIONS

TriTech

MEMBRANE RELATED PRODUCT

The **TriTech® PermaMax™ Integrated Membrane Bioreactor (TiMBR) system** is a combination of biological wastewater treatment and high efficient solids/liquid separation. Mechanically pre-screened wastewater is treated biologically and separated from the activated sludge using TriTech® PermaMax™ hollow fiber MBR membrane. The pores are small enough to prevent passage of all solids and bacteria, cells, fats, oils, colloids as well as viruses.

ADVANTAGES OF MBR

The key advantages of MBRs are that they provide a higher level of treatment and are much more resistant to upsets due to fluctuating influents flows. In addition, if land is at a premium, the MBR system can be designed to have a much smaller footprint of about 25% that of conventional plant

Product features and benefits

- Excellent quality product water

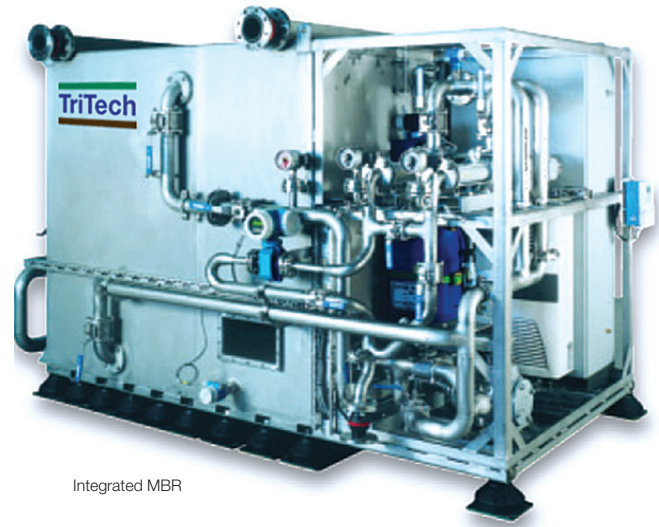
TriTech® PermaMax™ MBR hollow fiber membrane module utilizes PVDF(or PP) membrane with nominal pore size of 0.08 µm, and is capable of producing product water of reliable quality with below 1 NTU. The treated water is free from E. coli and has minimal suspended solids.

- Low capital cost and compact design

The MBR system does not require a final sedimentation tank and can be retrofitted into existing plant with ease. With a higher MLSS, of 8000-15000 mg/L, than conventional method, the MBR system can accept high organic (BOD) loading with less excess sludge production.

- Ease of maintenance

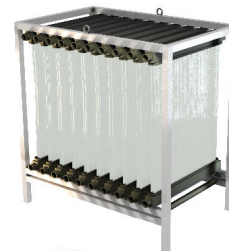
Minimal maintenance personnel required with full automation on system backwash and chemical clean-in-place (CIP).



Integrated MBR



Membrane module



Membrane skid

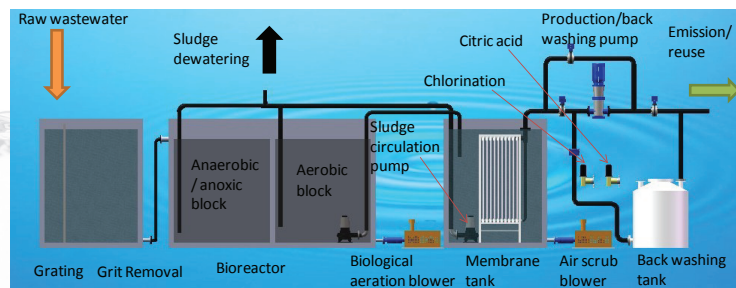


Wastewater treatment MBR membrane module (Taiqinggong, Laoshan)

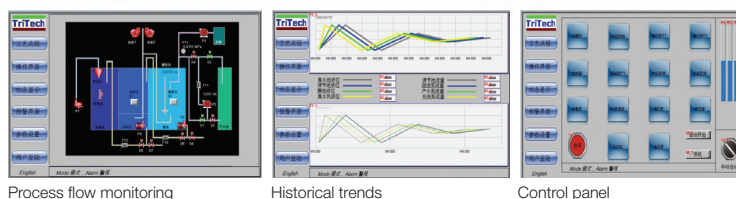
PERMAMAX™ MEMBRANE BIOREACTOR (MBR) PROCESS

TriTech® iMBR includes pretreatment screening, biological activated sludge treatment and submerged membrane filtration. Mechanical screening with 1mm screen size removes fibrous materials and other suspended solids from used water influent. Following screening, the influent flows into a biological tank for the removal of COD and ammonia (and phosphorus) using activated sludge process. The mixed liquor then flows into a membrane tank consisting of immersed TriTech® PermaMax™ hollow fiber membrane modules, which separates permeate water from mixed liquor suspended solids via filtration through the membrane into the clean water tank. The production flow rate of the PermaMax™ membrane is maintained using automated backwashing and chemical cleaning to reduce membrane fouling.

PROCESS FLOW SCHEMATICS



PLC HMI



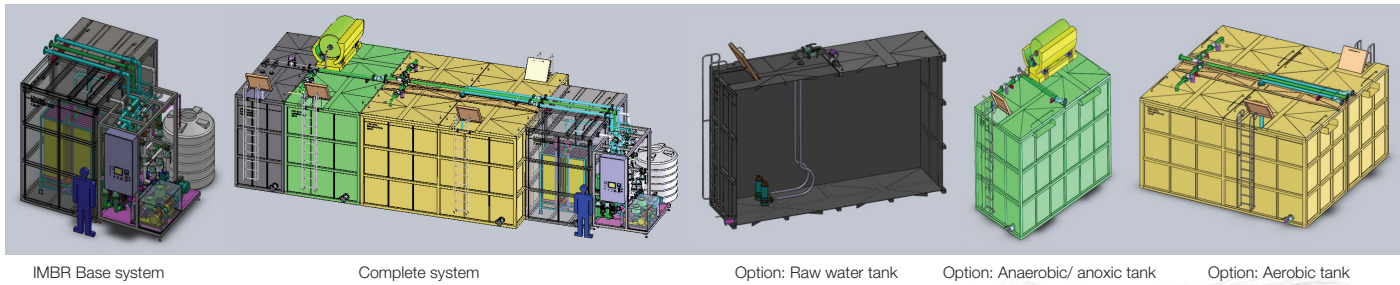
Process flow monitoring

Historical trends

Control panel

	Applications
Water and wastewater	Municipal sewage treatment, Industrial waste water treatment including chemical waste and food waste, livestock wastewater treatment, landfill leachate treatment

INTEGRATED MEMBRANE BIOREACTOR (TIMBR) MODULAR DESIGN



TRITECH® PERMAMAX™ MBR PRODUCT WATER QUALITY

Tritech® PermaMax™ MBR can produce high quality water, the product water can be directly reused as non-drinking water or industrial water. Product water's quality is better than "Discharge standard of municipal sewage treatment plant" (GB18918-2002) First A grade, "Municipal wastewater recycle, municipal non-drinking water quality" (GB/T 18920-2002), "Municipal wastewater recycle, industrial water quality" (GB/T 19923-2005) and is in accordance to Guidelines for the safe use of wastewater, excreta and greywater., WHO

	COD	BOD	TSS	Ammonia nitrogen	Total nitrogen	Total phosphorus	Turbidity	Total coliforms	SDI
Municipal wastewater	<30mg/L	<2mg/L	<1mg/L	<0.5mg/L	<3mg/L	<0.05mg/L*	<0.5NTU	<100cfu/100mL	<3
Industrial wastewater	>90%	>98%	>99%	>90%	>90%	>90%	<1 NTU	<100cfu/100mL	<3

*Chemical phosphorus removal with biological removal of phosphorus

PRODUCT RANGE FOR TRITECH INTEGRATED MBR SYSTEM

Pre-engineered Package Plants are cost effective and compact solutions for waste water treatment

Type	Model Series	Model	Cassette series used	Design capacity (m ³ /d)
I	TIMBR-S	S03	PermaMax-080	29
		S06		57
		S11	PermaMax-160	114
		S17		171
II	TIMBR-M	M11	PermaMax-300	108
		M22		216
		M33		324
		M44		432

MBR TRACK RECORD

Contract Name	Membrane Bioreactor Plant at Ulu Pandan Water Reclamation Plant, Singapore
Brief Description of the Works Performed	Design and build a 23,000m ² /day membrane bioreactor plant using submerged ultra-filtration membranes to treat mixed liquor to produce recycled water for Industrial use.
Name of Employer	Public Utilities Board, Singapore
Role	Main Contractor
Contract Value	US\$7,712,500
Contract Duration	July 2005 ~ December 2006



Permeate Pumps, Valves and Piping

Motor Control Centre

SCADA Graphics

TRITECH'S SYSTEM

Benefits:

1. Tritech® PermaMax™ MBR membrane effectively blocks and removes particles, bacteria, viruses and cysts from water supply
2. Complete systems incorporate screening, biological treatment, membrane, tanks, equipment skids and disinfection.
3. PLC control provides cost-effective operation and maintenance
4. Compact footprint allows installation inside existing building or infrastructure
5. Prefabricated equipment minimizes site work and reduces on site installation costs
6. Pretreatment for RO membrane
7. Expandable modular design
8. Two train systems provide process redundancy. The plant is still operational during maintenance.

Base system

1. Membrane tanks with aeration blowers
2. Skid mounted permeate pumps, valves control, PLC HMI interface
3. Backwash system

Application Dependent options

1. Biological equipment includes screening, process blowers, diffuser, sludge return pumps
2. Chemical systems for membrane cleaning
3. Effluent quality real time monitoring system
4. UV disinfection
5. Biological Tanks and aeration system