



Wastewater Treatment: Layne MBR

POREFLON[®] Membrane Bioreactors

Layne Membrane Bioreactors (MBRs) enhance municipal and industrial wastewater treatment by clarifying wastewater from within the biological treatment system, eliminating downstream clarifiers.

While most MBRs use hollow fibers made from PVDF, Layne MBRs utilize POREFLON fibers made from PTFE (polytetrafluoroethylene). The PTFE fibers achieve superior filtration and are simply the strongest, most chemically-resistant, temperature-resistant and longest service MBR fibers available.

Superior filtration is achieved with 0.2 micron pore sizes similar to PVDF and PET, but with a much tighter pore size distribution. This, along with a higher porosity, allows the Layne MBR to operate at as much as twice the flux rate of conventional systems.

Strong hollow fibers made from POREFLON have six times the tensile strength of PVDF, which allow us to resist the leaks and failures that are often associated with competing PVDF type MBRs.

The highest operating temperature of any available MBR is achieved with POREFLON, operating in environments up to 50°C (122°F) with our standard product. The fibers themselves can withstand up to 260°C (500°F).

Chemically resistant POREFLON is stable against all acids, alkaline solutions, oxidizers and solvents with a pH tolerance of 0-14. POREFLON can be used in harsh applications and survives rigorous cleaning cycles, for full restoration of membrane performance. This MBR will outperform and outlast the competition, especially in harsh environments.



MBRs are available in a variety of configurations for both new construction and system retrofits.

Highly hydrophilic POREFLON needs no pre-treatment and, unlike PVDF elements, POREFLON can be stored dry. This significantly lightens the weight of the elements for easy storage, handling and shipping - and provides for a much easier and cost effective installation.

POREFLON has been field tested in multiple industries and applications, and sets a new standard for MBR performance.

MBRs using POREFLON hollow fibers are available in the U.S. exclusively through Layne Christensen Company.

Benefits of Layne POREFLON MBRs:

- Municipal and Industrial Wastewater Applications
- Superior Filtration
- Long Service Life
- Stands Up to Rigorous Cleaning
- Withstands Harsh Conditions
- Resists Wear
- Stores, Installs and Ships Dry
- California Title-22 Compliant
- Lower Air Scour (Up to 50% less)
- Longer Warranty Available

Physical Characteristics

- High Flux Rate
- High Porosity
- Chemically Resistant
- High Tensile Strength
- Temperature Resistant



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Layne Christensen Company

Water Technologies:

Define
Develop
Deliver



POREFLON MBR Performance Comparison

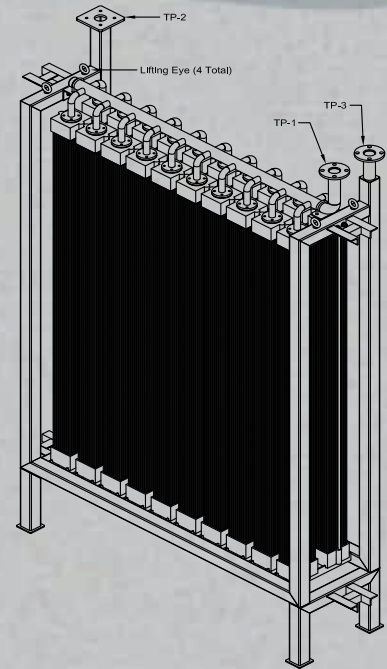
	Poreflon (PTFE)	PVDF
IPA Flux (ml/cm ² • min)	6	1.5
Pore Size	0.2µm	0.1µm
Porosity	80%	67%
Outer Diameter	2.3 mm	1.3 mm
Inner Diameter	1.1 mm	0.7 mm
Tensile Strength (Newtons)	63N	10N

Pre-Engineered Package Plants

Model	W	L	H	Max GPD
Layne MBR-S10	5.5'	24.5'	8.0'	10,000
Layne MBR-S12	6.5'	24.5'	8.0'	12,000
Layne MBR-S16	8.5'	24.5'	8.0'	16,000
Layne MBR-S20	10.5'	24.5'	8.0'	20,000
Layne MBR-S25	8.5'	32.5'	9.0'	25,000
Layne MBR-S36	8.5'	34.5'	10.0'	36,000
Layne MBR-S45	10.5'	34.5'	10.0'	45,000
Layne MBR-S60	10.5'	45.5'	10.0'	60,000
Layne MBR-S75	11.9'	46.0'	12.0'	75,000
Layne MBR-S100	11.9'	56.0'	12.0'	100,000
Layne MBR-S120	14.0'	56.0'	12.0'	120,000

POREFLON MBR Installations (over 60)

Customer	Capacity (GPM)	Installation Year	Customer	Capacity (GPM)	Installation Year
Steel mill	26,417	2010	Wastewater treatment	1,479,363	2008
Steel mill	13,209	2010	Wastewater treatment	26,417	2008
Steel mill	26,417	2010	Wastewater treatment	581,178	2008
Tire plant	26,417	2010	Glass substrate plant	66,043	2007
Waste incineration	2,642	2010	Grey water treatment	26,417	2007
Waste landfill	132,086	2010	Titanium refinery	66,043	2007
Wastewater treatment	158,503	2010	Train operation	66,043	2007
Wastewater treatment	52,834	2010	Alloy plant	105,669	2006
Wastewater treatment	211,338	2010	Bearing plant	211,338	2006
Wastewater treatment	1,109,522	2010	Electronic device plant	343,424	2006
Water treatment	581,178	2010	Electronic substrate plant	66,043	2006
Electric machinery plant	396,258	2009	Fertilizer plant	184,920	2006
Metal recovery plant	15,850	2009	House maintenance	317,006	2006
Oil drilling	2,113,376	2009	Semiconductor plant	79,252	2006
Precision machinery	277,381	2009	Wastewater treatment	52,834	2006
Wastewater treatment	1,521,631	2009	Drinking water	190,204	2005
Wastewater treatment	52,834	2009	Semiconductor plant	34,342	2005
Wastewater treatment	190,204	2009	Beverage plant	36,984	2004
Drinking water	79,252	2008	Electronic substrate plant	285,306	2004
Non-ferrous metal plant	21,134	2008	Farm	63,401	2004
Precision machinery	792,516	2008	Semiconductor plant	79,252	2004
Semiconductor plant	528,344	2008	Wastewater treatment	317,006	2003



PTFE MBR Module Specifications

Membrane	Hydrophilic PTFE
Pore size	0.2 µm
Casing Material	ABS Resin
Potting Material	Polyurethane/ Epoxy Resin
Filtration Method	Suction
Max. TMP	90 Kpa (3 psi)
Max. Op. Temp	50°C (122°F)
pH Range	0-14
Design Flux	18-22 GFD
California Title-22	Compliant

Example Performance Data from Anyang Sewage Station, Korea

Volume:	19,813 GPD
MLSS:	8,000-12,000 mg/l
Total Membrane Area:	125m ² (1,346ft ²)
Set Flux:	0.6 m/day (14.72)

Param.	Source (mg/l)	Treated (mg/l)	Removal Rate (%)
BOD	169	4.5	97
CODMn	112	6.4	94
SS	107	0.2	99
T-N	32	8.6	72*
T-P	11	4.2	63

*BNR package not included, which provides a higher level of nitrogen control.