TORAY MEMBRAY

东 丽 膜 生 物 反 应 器

东丽是一个在多个国家和地区都有运营的多元化企业。
Toray is a diversified corporate group with operations in many countries and regions.

东丽在水的高技术净化、过滤、分离用品及操作设备方面的制造是全球性领导者之一。东丽的膜分离技术在世界范围处于领先地位。东丽研发的创新微滤膜元件是采用平板膜和框架结构而成的浸没式平板膜生物反应器。
Toray has been a leading manufacturer and worldwide marketer of high-tech water purification, fluid filtration, separation and handling equipment for over 10 years. Having worldwide pioneered membrane technology, Toray develops innovative microfiltration with plate-and-frame configuration together with Flat Sheet Membrane on MBR-Membray.

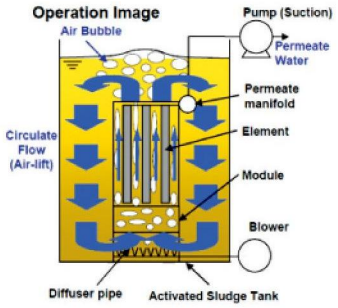
MBR (Membrane Bioreactor)

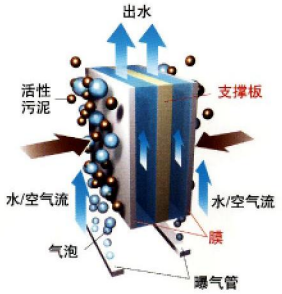
浸没式平板膜元件采用平板膜的框架结构，当用于膜生物反应器系统时，可以有效地截流悬浮污泥。在东丽先进的聚合体技术的基础上，它萃取性能好、坚固耐用、水渗透性好。浸没式平板膜组件用于生活污水和工业废水的处理和循环再回用。

MEMBRAY* submerged flat sheet membrane module, when used as a component of a membrane bioreactor (MBR) system, effectively removes suspended solids. Based on Toray*s advanced polymer technology, it offers excellent extraction performance, durability and water permeability. MEMBRAY* modules are used in the treatment and recycling of sewage and industrial wastewater.

浸没式平板膜的过程是污水生物处理和薄膜过滤的组合。《利用细菌及微生物，可减少生物降解污染》。根据生物处理，利用微滤膜，可分隔污水与生物污泥。浸没式平板膜元件取代传统的处理方法而将澄清、曝气和过滤集于一体，高品质的出水、污水排放、回用，适用于市政、商业和工业废水的处理。

Membrane Bioreactor (MBR) process is a combination of biological wastewater treatment and membrane filtration. <Biodegradable pollution is reduced using bacteria and microorganisms>. Following biological treatment, the biological sludge is separated from the treated water by a microfiltration membrane. MBR system replaces conventional treatment and combine clarification, aeration and filtration into consistent, high quality effluent which suitable for discharge or reuse on municipal, commercial and industrial wastewater treatment.





浸没式平板膜组件的特点

Features of Membray MBR with submerged Flat sheet Membrane

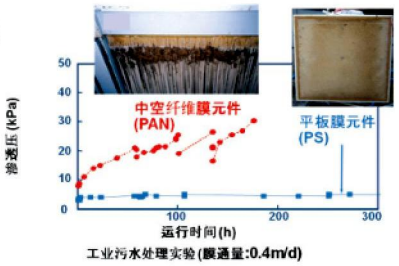
- 采用膜分离活性污泥可以确保高品质的出水，与反渗透技术结合，可把污水再回收，用于其他应用。
  Higher quality of effluent with free of suspended solid by using membrane technology. Combining with RO technology, water can be reused for other application.

- 膜可以有效地截流悬浮污泥并维持极高的活性污泥浓度，有效地将BOD、氨氮等处理到极低的浓度。
  Membrane retained high concentration of activated sludge which result in high efficiency of removal of BOD and nitrogen.

- 独特的小孔径膜结构，能有效地抗堵塞，具有稳定的高通量透水性能，提供高品质的出水。
  Unique membrane configuration with immense number of pores offer stable effluent with minimal clogging and continuity of good water quality.

- 膜元件直接放置在活性污泥池中，将生物降解与膜分离结合起来，这样节省了二沉池或污泥浓缩工艺。
  Because the module is submerged directly into an activated sludge tank for combining effective biological treatment and membrane separation, no sedimentation or sludge concentration tank is requested. Space can be saved.

- 采用平板膜的框架结构，比中空纤维膜有更有效耐污染性能，大大降低了化学清洗频率。
  Using flat sheet membrane, fouling on membrane surface is comparatively less than Hollow Fiber membrane. Hence, less chemical cleaning is required.

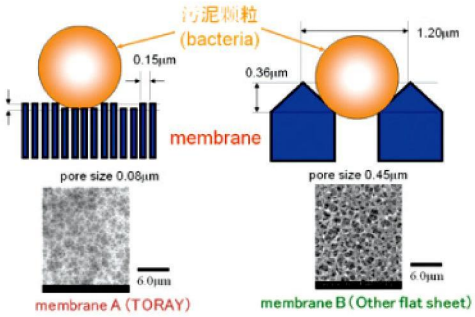


- 由于更有效的曝气和低跨膜压差，它比中空纤维膜元件消耗能源更少。
  Less energy is consumed compared with Hollow Fiber due to more effective souring aeration and lower trans-membrane pressure.

平板膜元件与中空纤维膜元件的比较表

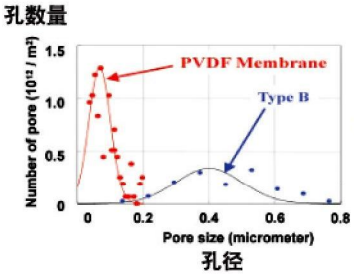
Comparison Table for Flat Sheet and Hollow Fiber

平板膜 Flat Sheet	优势 Advantage	少化学试剂清洗	Less Chemical Dosage for Cleaning
		利用曝气有效清洗	Using Aeration for Effective Cleaning
		利用重力-以减轻压力损失	Using gravity operation to reduce the pressure loss
		更高的出水率	Higher Flux rate
		易于维修	Easy Maintenance
		线上清洗	In Line Cleaning
	劣势 Disadvantage	面积相对小	Area is comparatively less
中空纤维膜 Hollow Fiber	优势 Advantage	面积相对大	Area is comparatively large
		可反向冲洗	Can be backwashed
	劣势 Disadvantage	因为中空纤维是易堵塞，预处理的要求将会比较严格	Because hollow fiber is easily blocked, the requirement of pretreatment will be rigid.
		频率清洗是必要的，每星期两次	Frequent cleaning is necessary once or twice per week
		必须要离线清洗，(使得清洗)工作较为繁重	Off line cleaning is necessary result in heavy work load



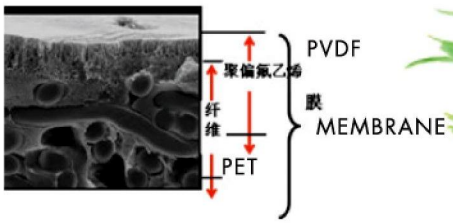
✣ 拥有超过25年的研究和技术开发经验，东丽研发平板膜片由聚偏氟乙烯材料制造而成，平板膜片上拥有无数均匀0.08微米小孔。这种小孔的径膜结构能有效地抗堵塞，具有稳定的高渗透水性能，提供高品质的产水。

Having more than 25 years experience on research and technological development, Toray develops flat sheet membrane which is made of Polyvinylidene Fluoride (PVDF) with numerous of 0.08 μm pores. This pore size which results in less clogging on membrane surface and keep permeate in good quality and high flux.



✣ 无数个微细小孔平均分布在整个膜性的表面，它确保畅通的高品质出水和良好的渗透性。

Numerous pores are evenly distributed throughout the membrane surface with narrow diameter distribution. It keeps the effluent with consistently high quality and permeability.



✣ 聚偏氟乙烯材料耐化学腐蚀，物理性强度高。聚偏氟乙烯的功能层在聚酯纤维的承载层下使膜展示出更高物理强度及化学强度。

Material of PVDF is chemically resistant with strong physical strength. The functional layer of PVDF with support layer of Polyester (PET) allows membrane to exhibit superior physical strength and chemical strength.

✣ 膜元件拥有一个简单的平板构造，这个构造以及改良的膜表面特性使得曝气产生的上升流体能有效冲刷膜表面，导致颗粒物质难以在膜表面沉积，保证稳定的过滤性能。

The modified membrane surface with flat sheet configuration allow the membrane can be cleaned effectively by a stream of water upward as souring air is diffused below it. This mechanism provides stable filtration and sludge is not easily adhered to surface of membrane.

Specification of Membrane Element — TSP50150 For Membray TMR140

模型名称	Model Name			TSP-50150
膜结构	Membrane Configuration		平板	Flat Sheet
用途	Application		活性污泥过滤	Filtration of activated sludge
过滤方法	Filtration Method		吸滤	Suction Filtration
表面径孔	Nominal Pore Diameter (μm)			0.08
有效膜面积	Effective membrane area (M^2)			1.4
尺寸 Dimensions (mm)	总宽	Total Width		515
	总高	Total Height		1608
	厚度	Thickness		13.5
重量 Weight (kg)	干	Dry		4.8
	湿（供参考）	Wet (reference)		8.0
主材料 Main Material	膜	Membrane	聚偏氟乙烯和无纺布聚酯纤维	PVDF and PET non-woven Fiber
	支撑板	Supporting Panel	ABS树脂	ABS resin

Specification of Membrane Element — TSP50100 For Membray TMR90

模型名称	Model Name			TSP-50100
膜结构	Membrane Configuration		平板	Flat Sheet
用途	Application		活性污泥过滤	Filtration of activated sludge
过滤方法	Filtration Method		吸滤	Suction Filtration
表面径孔	Nominal Pore Diameter (μm)			0.08
有效膜面积	Effective membrane area (M^2)			0.9
尺寸 Dimensions (mm)	总宽	Total Width		515
	总高	Total Height		1059
	厚度	Thickness		13.5
重量 Weight (kg)	干	Dry		3.0
	湿（供参考）	Wet (reference)		5.0
主材料 Main Material	膜	Membrane	聚偏氟乙烯和无纺布聚酯纤维	PVDF and PET non-woven Fiber
	支撑板	Supporting Panel	ABS树脂	ABS resin

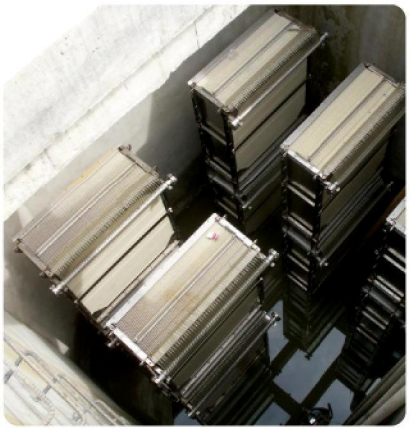
Specification of Toray Membray — For TMR090 & TMR140 series Module

模型名称 Model Name		TMR090-050S	TMR090-100S	TMR140-050S	TMR140-100S	TMR140-200W	TMR140-200D
标准流量（立方米/天） Standard Flow (M^3/Day)*		34	68	52	105	210	210
模元件数量 No. of Elements		50	100	50	100	200	200
模堆结构 Element Block Structure		1 Deck 1 Row	1 Deck 1 Row	1 EBL	1 EBL	2 EBL Jointed	Double Deck w/ 2 EBL
尺寸 Dimensions (mm)	宽 Width	711	711	810	810	840	810
	长 Length	1016	1719	950	1620	3260	1620
	高 Height	1474	1474	2100	2100	2100	4160
Total Membrane Area (M^2)		45	90	70	140	280	280
重量 Weight (kg)	干 Dry	360	675	400	695	1430	1365
	湿 Wet	570	1100	690	1240	2480	2500
Material of Diffuser	Frame & Permeate water manifold	SS 304 (316L SS is available as an option)					
	Diffuser	EPDM (HTPU as an Option)/PVC/304SS		SS 304 (316L SS is available as an option)			
Connection Flange	Manifold	ANSI 150lb 1¼B	ANSI 150lb 2B	ANSI 1½ inch	ANSI 2 inch	ANSI 3 inch	ANSI 2 inch
	Diffuser	NPT 1½(One Side)	NPT 1½ (Both Side)	ANSI 1¼ inch	ANSI 1½ inch	ANSI 2 inch	ANSI 1½ inch

- 这个参考值基于城市废水。对于其它的废水，设计通量会比较低。
  The value is reference based on typical municipal waste water. For other waste water, the flux will be lower.
- 东丽对所有数值的改变不作任何通知。
  All value will be changed subject without any notice by Toray.

业绩介绍

Job Reference



Country/国家	Application/应用	Cacpacity/规模(m3/d)	Module Type/型号
U.S.A./美国	Municipal/市政污水	1,900	TMR140-100S
China/中国	LCD/LCD电子废水	6,500	TMR140-200W
UAE/阿拉伯联合酋长国	Municipal/市政污水	38,000	TMR140-200D
UAE/阿拉伯联合酋长国	Municipal/市政污水	45,000	TMR140-200W
KSA/沙特阿拉伯	Municipal/市政污水	30,000	TMR140-200D

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