

Ecologix Flat Sheet Membrane Module

Membrane module is **the core product** of MBR system



Ecologix Technologies Asia Pacific, Inc.

an Ecologix company, USA
Since 1992

What is MBR ?

MBR is to install the membrane module in the activated sludge tank, integrate the previous traditional sewage treatment process - aeration, sedimentation into a single process. MBR can perform stable filtration function and simultaneously retain activated sludge, enhance MLSS to 15,000 mg/L, to carry out the high-efficiency decomposing biological characteristics. Not only improve the high quality of the effluent, but also reduce 1/2 area of sewage treatment plant and 1/2 of the waste sludge. Therefore, at the condition of MLSS 15000mg/L, if the membrane is not blocked by sludge, it is your only choice!



Pictures: Taken from the maintenance project undertaken by our company to solve the sludge clogging of hollow fiber membranes. At MLSS 10,000mg/L, the operating procedure is self-priming for 8 minutes, pump backflushing for 2 minutes, and the hollow fiber membrane bundle still quickly absorb the sludge. The air bubbles cannot wash away the sludge inside the entire bundle of fiber membranes, so the TMP increases rapidly, and the water output drops sharply by 1/2. It is necessary to crane out the hollow fiber membrane module once per month, clean the hollow fiber. Soaking chemicals, cleaning aeration pipes, pay expensive unloading and cleaning costs.

■ Many membrane filtration research reports mention that hollow fiber is suitable for rainwater filtration.

Ecologix Accumulating 10 years of MBR operation, maintenance experience, included Zenon, Mitsubishi, Asahi Kasie, Sumitomo hollow fiber module, Toray, and Kubota flat sheet module, after understand more problems, then cooperation with the world's leading Membrane manufacturer in Japan and Germany, and offered encapsulate machine to made Ecologix PVDF membrane panel(element), then assembly Ecologix immersible flat sheet membrane module in Taiwan via **TRIPARTITE COOPERATION**.



ECOLOGIX

Tripartite

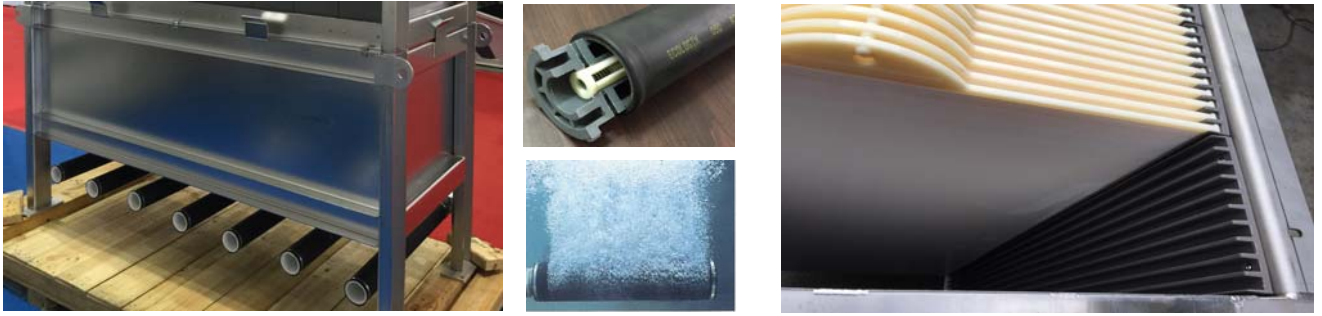
Cooperation

Via Germany, Japan, Taiwan research and after eliminating the shortcomings of others brands flat sheet module, Ecologix flat sheet module was succeed and produced in Taiwan (Country) since 2008



- Via Japanese membrane panel encapsulate machine, membrane module assembly technology instructs in the Taiwan factory, so that the Ecologix flat sheet membrane module has a highest quality.
- Exclude the problems that are difficult from other brands to solve, must clean air diffuser by invalid venturi effect every day, design with Jager in Germany together, installed clogging prevent, high toughness membrane tube air diffuser in aeration case. With this performance, Ecologix emphasize that the aeration system does not need to be cleaned every day during operation 7 to 8 years. the membrane surface prevents sludge caked, With this Unique feature, the Ecologix MBR module fast access to the global markets.

Ecologix flat sheet module installed clogging prevent, high toughness membrane tube air diffuser.



↑ High toughness and clog preventing membrane tube diffuser in aeration case.

↑ Injected rigid element insert track design.



MLSS 15000mg/L



After discharge out sewage, membrane panel are still neatly spaced



pulled out by hand easily



Confirm that the operation is smooth every day and there will be no unexpected problems: Continuous operation under MLSS 15000mg/L for 8 years, without aeration system cleaned every day during the period. Each membrane plate still maintained 6mm space and could be pulled out by hand easily!

Ecologix immersible Flat sheet module Specification

Ecologix module unit



Membrane panel (element) specification

- Membrane:
 - PVDF, 0.05µm (Germany)
 - cPVC, 0.2µm (Japan)
- Operation TMP: ~20kPa
- Operation temp.: 5-40°C
- MLSS concentration: ~15,000mg/L



Membrane panel (element) Size:

- EK-08: 490mm x 1,000mm x t.6mm, 0.86m²/element
Replace Kubota #510, #H7-510 element available.
- EW-14: 490 x 1,500 x t.6mm, 1.33~1.34m²/element

Single deck module	EK-60S	EK-80S	EK-100S	EK-120S	EK-150S	EK-180S	EK-200S
Membrane area, m ²	51.6	68.8	86.0	103.2	129.0	154.8	172.0
Size: L x W x H, cm	94 x 59 x 173	122 x 59 x 173	150 x 59 x 173	178 x 59 x 173	220 x 59 x 173	262 x 59 x 173	290 x 59 x 173

Single deck module	EW-60S	EW-80S	EW-100S	EW-120S	EW-150S	EW-180S	EW-200S
Membrane area, m ²	79.8	106.4	133.0	159.6	199.5	239.4	266.0
Size: L x W x H, cm	94 x 59 x 223	122 x 59 x 223	150 x 59 x 223	178 x 59 x 223	220 x 59 x 223	262 x 59 x 223	290 x 59 x 223

Double deck module	EK-120D	EK-160D	EK-200D	EK-240D	EK-300D	EK-360D	EK-400D
Membrane area, m ²	103.2	137.6	172.0	206.4	258.0	309.6	344.0
Size: L x W x H, cm	94 x 59 x 306	122 x 59 x 306	150 x 59 x 306	178 x 59 x 306	220 x 59 x 306	262 x 59 x 306	290 x 59 x 306

- Flux rate Recommended (*):
 - municipal sewage: 0.6~0.7m³/m²/day
 - industrial sewage: 0.4-0.55m³/m²/day.
- (*): consider stabilizing permeate high quality effluent, membrane life and reduce the frequency of chemical In-line cleaning (CIP).
- Custom size of module available, it can be meet the existing tank size or flow rate requirements. Each module membrane element is assembled in increments or decreases at 10 pcs.

Ecologix Skid Mounted Package MBR Plant-EcomemXpress

Easy installation and quick operation !



Customers sold in recent decades
Flow rate from 20 to 600m³/day

- General Industrial
- Dairy and General Food plant
- Meat Recovery refining plant
- Poultry slaughterhouse and Further processing
- Fish slaughter frozen food factory
- School and Hospital sewage
- Shopping mall and Restaurant sewage



Industrial MBRs

5.1.12 Food processing plant, Taipei, Taiwan
The MBR plant for treating food processing effluent was installed in May 2012... The MBR plant is based on an EcoMem compact MBR. The existing process had pre-treatment based on a 1 mm rotary drum screen followed by a CAS process upgrade the existing plant, and is based on an EcoMem compact MBR. The existing process had pre-treatment based on a 1 mm rotary drum screen followed by a CAS process upgrade the existing plant, and is based on an EcoMem compact MBR. The existing process had pre-treatment based on a 1 mm rotary drum screen followed by a CAS process upgrade the existing plant, and is based on an EcoMem compact MBR.

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The package plant provided for the upgrade was the Ecologix EcoMem-600PKG (Fig. 5-7a) containing a 12,000 mm long x 2,000 mm wide x 2,400 mm high membrane tank constructed of SS 304. The tank is fitted with 12 EcoPlat™-1205 cassettes of 103.2 m² each (yielding 1,238 m² total), each cassette housing 20 LMH. The membranes are scouring at a rate of 0.52 Nm²/(m²·h) (rated at 3 m head). The MBR permeate is directed to an RO stage which provides water for the fluming of vegetables.

The wastewater is delivered to the existing aeration tank and continuously recirculated at a ratio of 2Q through the membrane tank via duty/standby sludge return pumps of 50 m³/h capacity each. Two level switches in the membrane tank control the supply and MBR permeate pumps, the latter comprising two self-priming pumps each of 25 m³/h capacity (duty/standby). The MLSS is kept within the range between 8,000 and 12,000 mg/L.

The MBR permeate produced has COD and BOD levels below 50 and 5 mg/L respectively, from an influent water containing 1,200 and 800 mg/L mean concentrations of COD and BOD. The package plant has successfully provided a plug-and-play solution for capacity expansion without requiring costly construction.

Figure 5-7 (a) The EcoMem compact MBR installed at the site in Taipei, and (b) the EcoMem Inset permeate and sludge samples from the site.

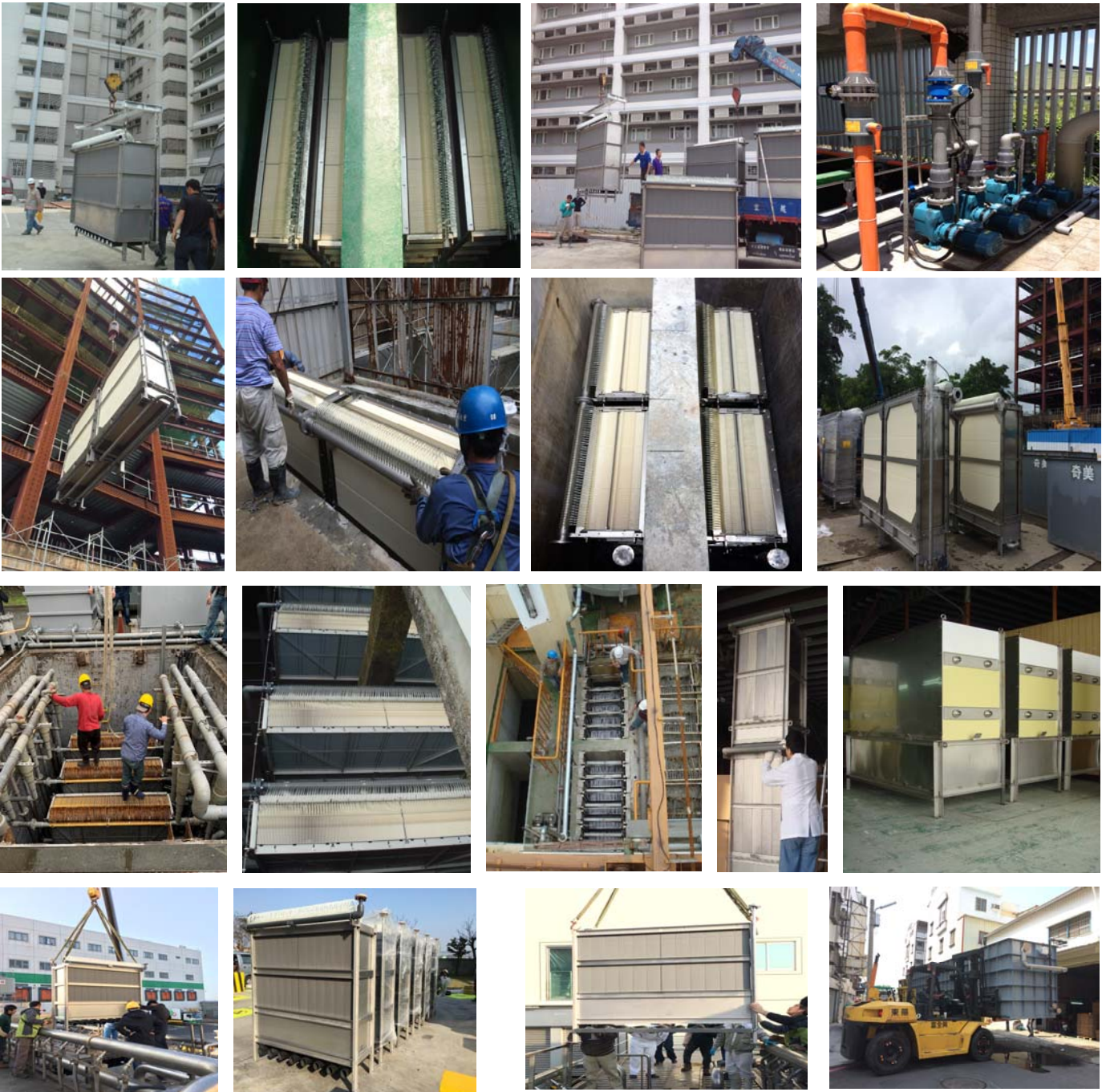
Ecologix package MBR plant case study in industrial mbrs
MBR plant; food process factr,600m³/day
Influent: COD 1200mg/L, BOD 800mg/L
Effluent after Ecologix flat sheet module:
COD 50mg/L, BOD 5mg/L

Installation reference, from 2006: Classified choice one plant by various sewage

- | | | |
|--------------------------|----------|--|
| ■ Food factory, | 600CMD: | EcomemXpress-600cmd package MBR plant |
| ■ Food processing plant, | 400CMD: | EcomemXpress-400cmd package MBR plant |
| ■ Hospital, | 500CMD: | EK series module, PVDF membrane |
| ■ Restaurant center, | 1200CMD: | EcomemXpress-600cmd package MBR plant x 2 plants |
| ■ College, universities | 500CMD: | EK series module, PVDF membrane |
| ■ Meat processing plant, | 400CMD: | EcomemXpress-400cmd package MBR plant |
| ■ Landfill sewage plant, | 4800CMD: | EK series module, PVDF membrane |
| ■ Meat Refinery plant, | 200CMD: | EcomemXpress-200cmd package MBR plant |
| ■ Meat Refinery plant, | 350CMD: | EcomemXpress-350cmd package MBR plant |
| ■ Petrochemical, | 5400CMD: | EK series module, PVDF membrane |
| ■ Chemical plant, | 500CMD: | EcomemXpress-500cmd package MBR plant |

Total around 228 projects in South East Asia, China, Latin USA, Iran, and Mid Asia till 2020

Partial photos from the MBR installation site



Appendix 1: Maintenance, Improvement Records-Hollow Fiber module: S-brand

A food factory uses Hollow fiber membranes module. After half a year of operation, the negative pressure (TMP) suddenly increased and the water output dropped 60% sharply. We Ecologix were entrusted to design an external hanging soaking system to carry out regular external hanging cleaning and chemical soaking of the Hollow fiber bundles every 3 months, which cost a lot of money. The cost of hoisting works and manual cleaning is huge.



In this project beginning, **VEOLIA** emphasized that it can operate under the condition of high concentration sludge MLSS 12000mg/L to carry out high-efficiency decomposition of biological characteristics (degradation of COD, BOD).

However, in the field MBR plant, the hollow fiber membrane can't permeation water smoothly at the concentration 10,000mg/l of MLSS, and quickly sticking the sludge, The diffuser bubbles of the module cannot rush into the hollow fiber bundle cluster to remove the sticking sludge (as shown in the photo above), so the water output drops sharply, and the TMP rises rapidly, must lift it out of the MBR tank, to cleaning the hollow fiber bundle and chemical soaking.

A year later, client visited Ecologix client (food processing factory) and listen to customer appreciation, they decide to replace the existing hollow fiber module, installed Ecologix flat sheet module. After installation, operates very smoothly, and only chemical in-line cleaning 2 hours once per 3 months. more than 5 years, at the MLSS 15000mg/L, TMP is maintained at 250mmHg, permeate suction high-quality effluent.



↑ High quality effluent

Ecologix contracted the replacement project: take out Japanese Hollow fiber module, installed Ecologix flat sheet modules.

Appendix 2: Maintenance, Improvement Records- Flat sheet Module, K brand

Ecologix repaired K brand module for membrane plate (element) replacement in the Netherlands, Dubai, India, Palau and Taiwan, etc., and found that their "aeration system" was seriously blocked (even if the daily cleaning was carried out) which causes the element at the upper end without air bubbles washing, the membrane to sticking the sludge quickly and squeeze each other into a "corpse block", which causes the water output to drop sharply and the negative pressure (TMP) of water absorption to increase. must periodically lift out the module, clean up the sludge caking, repair air diffuser and insert Ecologix PVDF membrane plate.



K brand



K brand



K brand



K brand



k brand



K brand

Replace K-Brand cPVC element with Ecologix PVDF element



Following K-brand manual: open air pipe flushing valve, use the "venturi effect" to suck out the blocked sludge 5 minutes a day, try to suck out the blocked sludge, but this is ineffective. At the site where we replace sludge caked membrane plate nearly 80 MBR plants, customers said in unison: we tried for several years, real ineffective, even if it is flushing valve opened for 1 hour, it will suck out sewage only, cannot suck out the blocked sludge! So, we must lift out the full module and aeration case from tank, insert a hard rod to squeeze out the blocked sludge from air diffuser air holes.

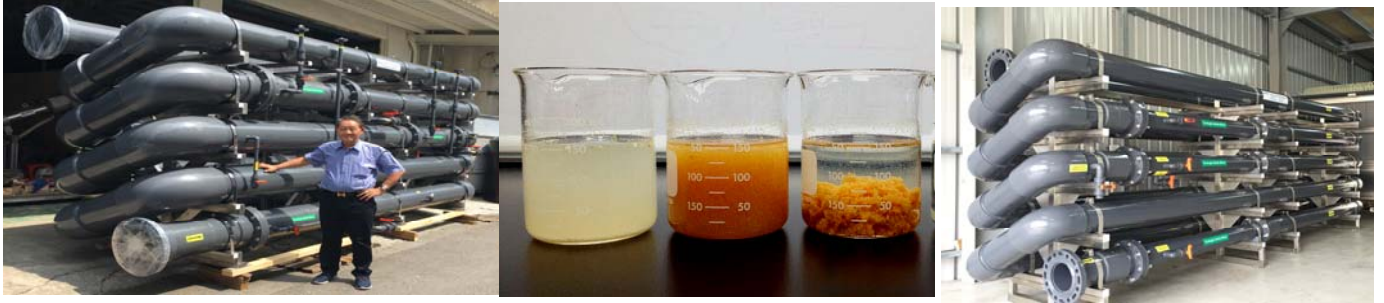


Ecologix products made in TAIWAN, Since 1992

Rotary Drum Screen: External-fed & Internal-fed, gaps 0.5mm and 1.0mm. flow rate: 50m³/h to 500m³/h



Pipe flocculator: Capacity from 10m³/h to 400 m³/h



Dissolved Air flotation(DAF)

TOYOTA Mexico Plant, 120cmh

Oily separation for river, 225m³/h



Fine bubble diffuser, Type: Disc and Tubing



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Office in Santee, California



Head office in Tainan, Taiwan (Not China), since 1992