

**STAR**  
**OASIS**

## **Using Guide for MBR Modules With Composite PVDF**



**MBR**

**membrane bioreactor system**



**PROUD**  
ASIA

# 1. Membrane - Bioreactor (MBR)

## 1.1 Introduction of Membrane - Bioreactor (MBR)

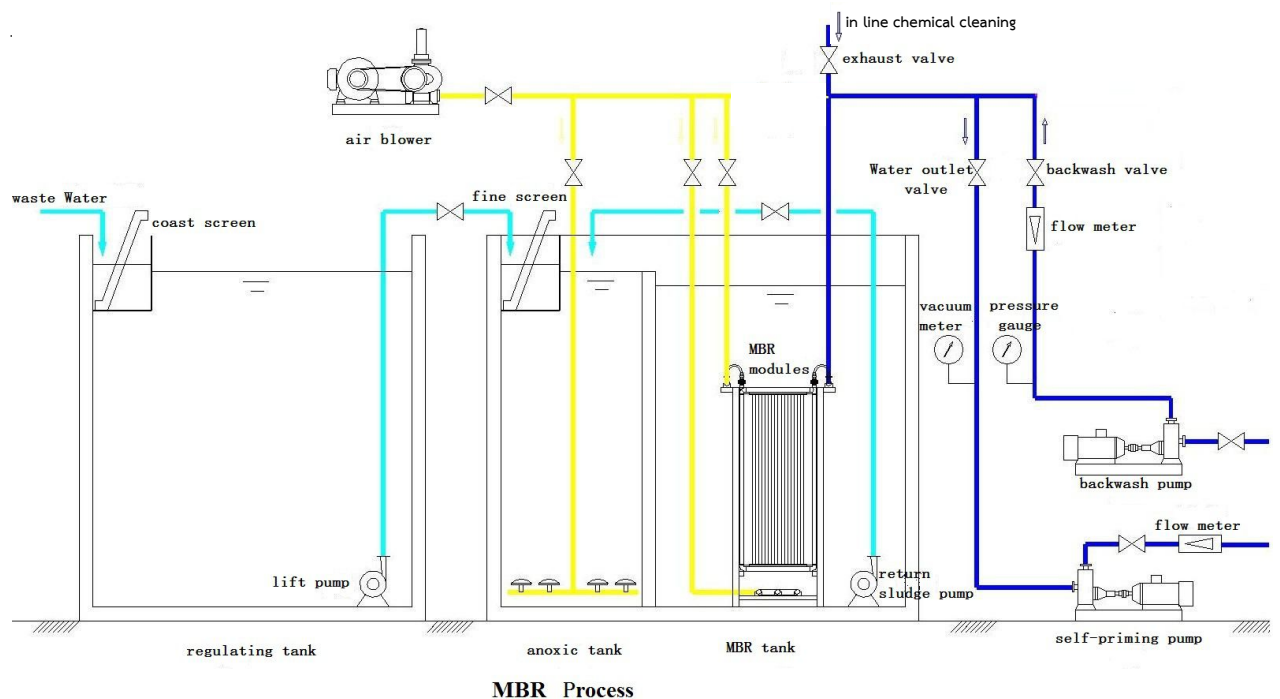
Membrane Bio-Reactor(MBR) technology is the combination of membrane separation technology and the traditional biological wastewater treatment technology. It can greatly strengthen the biological treatment efficiency. It is a new wastewater treatment and recycling process.

The advantage of the MBR is listed as the following:

- Higher efficiency of Bio-Reaction in the MBR tank.
- Higher concentration of MLSS in the MBR tank.
- Smaller tank with smaller HRT
- Quality confirmation of the effluent water by the filtration of the membranes.
- Operated automatically

## 1.2 MBR Process

MBR process can be described as the

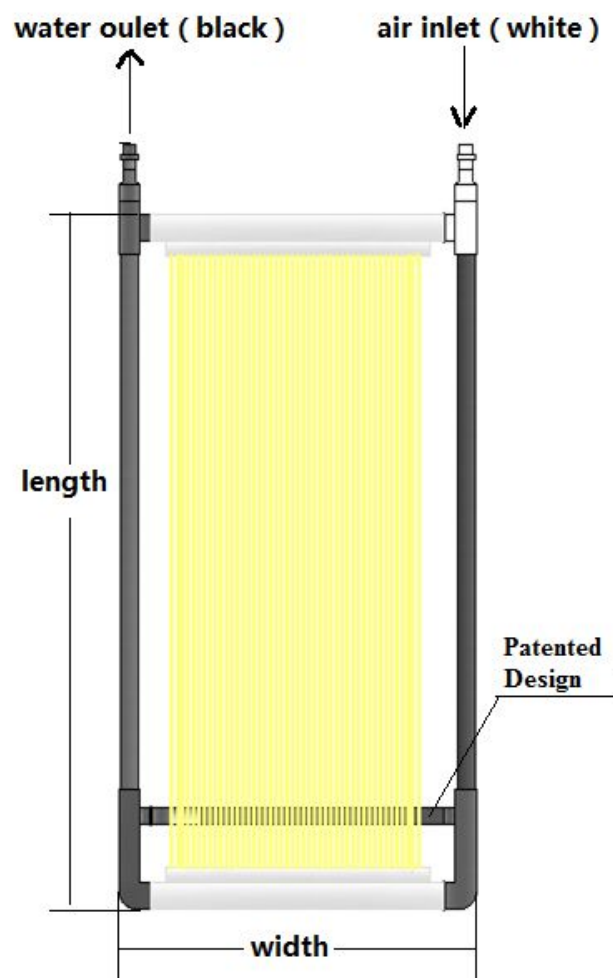


In the MBR process, the MBR module is the most important unit. The performance of the MBR modules will decide the investing and operating Costcost.

## 2. Introduction of MBR modules with composite PVDF

### 2.1 The structure and size of the MBR modules

Our MBR modules with composite PVDF are described as the following:



Every module has a separated Multi-pole for air blowing. It can ensure the effect of the air bubble washing the membrane surface.

**Note:**

“Water Outlet” with Grey Color connector

“Air Inlet” with White Color connector

## 2.2 Main Specification of the MBR modules

Model No.	KH-MBR-6-Co-PVDF	KH-MBR-10-Co-PVDF	KH-MBR-12-Co-PVDF
Membrane Area	6 m <sup>2</sup>	10 m <sup>2</sup>	12 m <sup>2</sup>
Height	1120 mm	1630 mm	1630 mm
Width	640 mm	640 mm	640 mm
Thickness	47 mm	47 mm	47 mm
Weight	6 kg	10 kg	15 kg
Membrane Material	PVDF/Supported PET tube	PVDF/Supported PET tube	PVDF/Supported PET tube
Micropore Size	0.05µm	0.05µm	0.05µm
Inner diameter	Ø 1.0 mm	Ø 1.0 mm	Ø 1.0 mm
Outside Diameter	Ø 2.4 mm	Ø 2.4 mm	Ø 2.4 mm
SS of the filtrated water	≤ 1 mg/L	≤ 1 mg/L	≤ 1 mg/L
Temperature	5 - 40 °C	5 - 40 °C	5 - 40 °C
PH	2 - 13	2 - 13	2 - 13
Flux rate for MBR system	12 - 18 L/m <sup>2</sup> /h	12 - 18 L/m <sup>2</sup> /h	12 - 18 L/m <sup>2</sup> /h
Operating Pressure	-0.01 - -0.08MPa	-0.01 - -0.08MPa	-0.01 - -0.08MPa
Operating Condition	Working 8 mins, then relaying 2 mins.	Working 8 mins, then relaying 2 mins.	Working 8 mins, then relaying 2 mins.

## 2.3 Special performance of the Membranes

- Membrane Material: PVDF with PET Braided Tube as the supported layer..
- Strength of tensile failure: ≥ 100 MPa
- Outer/Inner size of hollow fiber membrane: 2.4/1.0 mm.
- Permanent Hydrophilic

## 2.4 Real photo of the MBR modules



### Especial Note:

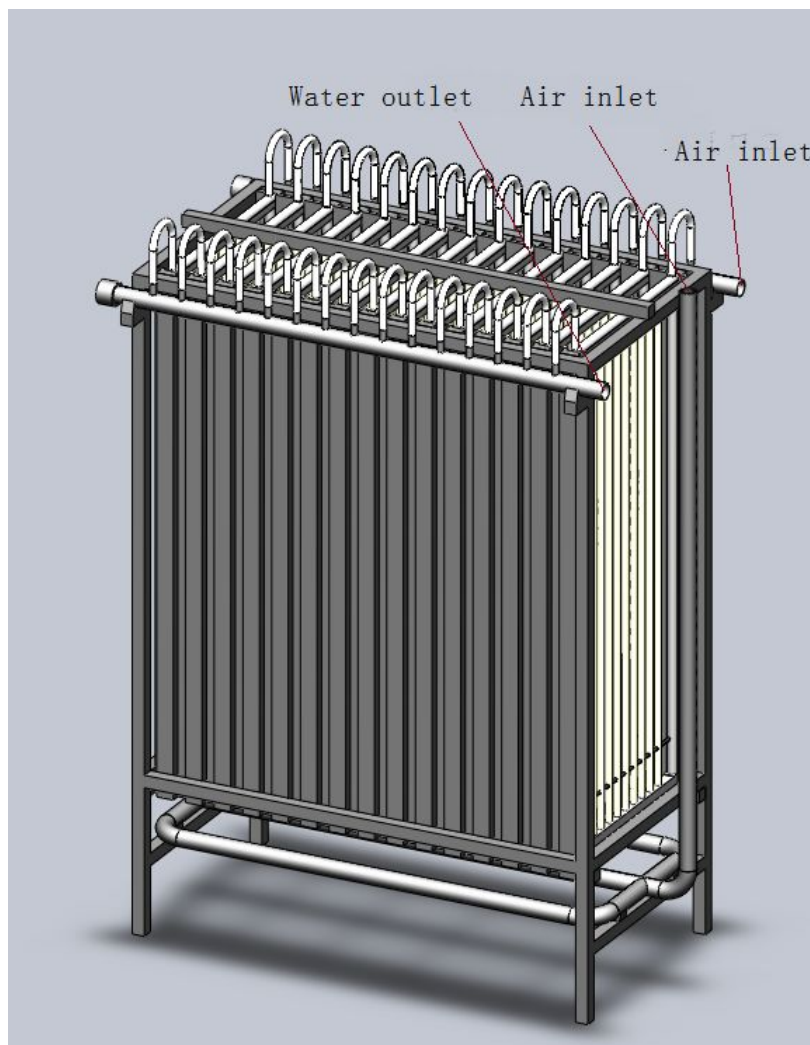
In the modules, the grey color connector is for effluent water, the white color connector is for air entering.

### 3. Requirements for the influent water

- \* Filtrated by the grill smaller than 2 mm.
- \* Oil concentration  $\leq 5$  mg/l
- \* COD  $\leq 2000$  mg/l
- \* Suitable MLSS: 2000 – 8000 mg/l

### 4. Structure of MBR unit with frames

Several pcs of Modules are installed in one unit of frame.



## 5. Supporting facilities

### \* Air Blower

The flowing rate is  $300 - 440 \text{ L/m}^2/\text{h}$  (per membrane area).

For example, 1 piece of KH-MBR-10-Co-PVDF need the air flux rate is  $3000 - 4400 \text{ L/h}$ .

The Air pressure of the air blower is decided by the height of the tanks.

### \* Sucking pump

The flowing rate of the sucking pump is 1.25 times of the flux rate of the membranes.

For example, when we use 40 pcs of MBR-12-Co-PVDF for a 120 CMD project, we need

a sucking pump with working flow rate  $6.25 \text{ m}^3/\text{h}$ .

### \* Backwashing pump

The flowing rate of the backwashing pump is 1.5 - 2.0 times of the flux rate of the membranes. The head of delivery is about 15m.

For example, when we use 30 pcs of MBR-10-Co-PVDF for a 100 CMD industrial waste water project, we need a backwashing pump with working flow rate  $7.5 - 10 \text{ m}^3/\text{h}$ .

The pressure of backwashing is  $0.10 \text{ MPa} - 0.15 \text{ MPa}$ .

### \* Chemical dosing pump

If the membrane is used to treat industrial waste water, we need chemical dosing pump.

The flux rate of the dosing pump is about  $(4 \times \text{membrane area}) \text{ L/h}$ .

For example, if we use 30 pcs of MBR-10-Co-PVDF in a project for an industrial waste water treating, we need a chemical dosing pump with the flux rate of  $1200 \text{ L/h}$ .

The pressure of chemical dosing pump is lower than  $0.10 \text{ MPa}$ .

### \* Testing Meters and Instruments

We need Flowmeter and vacuum gauge as the needing testing meters for every project with MBR membranes. The liquid level gages are needed to realize the auto operating.

## 6. Installation and Operating of MBR modules

- \* Before installation, we should confirm the bottom of the MBR tank is smooth.
- \* Then we hang the frames into the MBR tank. The frames should be apart from the tank wall about 400 -500 mm. And the spacing distance of two frames should be more 300 – 400 mm.
- \* The frames should be fixed on the bottom of the MBR tank.
- \* After all the frames are fixed into the MBR tank, we inject water into the MBR tank until the water level is close to the top of the frames.
- \* At last, we fix a pipe on the top of the frames to confirm all the membranes can't rise up during air-blowing.

After the MBR units are all installed into the tank, we can connect the air tube to the air blower, and the water collecting pipes to the sucking pumps.

## 7. Operating and Cleaning

- \* The MBR membrane modules should be used under the condition of stable flux rate.
- \* The MBR membrane should be working 8 mins, then staying 2 mins.
- \* The air blower should be operating continually.



**Esp.Note:**

If the air blower has fault to stop, the membrane should be stopped to work immediately.

\* If we use the backwashing pump in the system to treat industrial waste water, we advise once per every 4 hours to use the backwashing pump. The continued time can be 15 mins. We need to confirm the backwashing water should be clean.

\* If we use the chemical dosing pump in the system to treat industrial waste water, we advise once per week to use the backwashing pump. The continued time can be 15-30 mins. We need to confirm the chemical solution is correct.

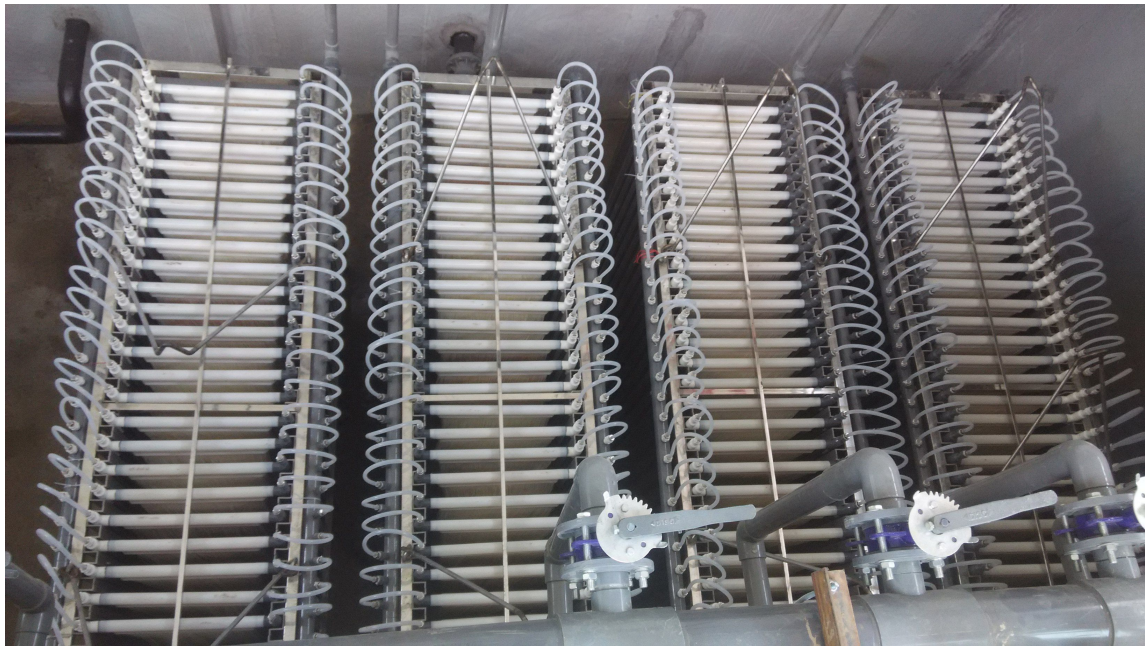
\* Chemical cleaning

**Inline-cleaning:** If we use the membrane to treat industrial waste water, we need inline-cleaning system. It includes chemical dosing pump and chemical solution tanks. In common, we use "0.5% of Citric acid" or "1% Sodium Hydroxide (NaOH)" as the in-line cleaning dosing chemicals. It depends on the polluting matters.

**Outside-Cleaning:** After the membranes have been used for more than 2-3 months or the operating pressure is more than -0.06MPa. We need pull out the membrane modules, and wash the surface with clean water and put them into an immersing tank. Then inject the cleaning chemical solutions. And then immerse for 2-3 hours or more.

We can use "0.5% - 1% Sodium Hydroxide (NaOH) + 0.1%-0.3% Sodium Hypochlorite (NaClO)" solution as the cleaning chemical solutions.

## 8. Examples for Installing of MBR Units.



( 4 Units Project with 26 pcs of MBR-10-CO-PVDF for 1 unit )





( 4 Units Project with 23 pcs of MBR-15-CO-PVDF for 1 unit )