Meat Processing (Slaughterhouse) Waste Water Treatment Plant

Features

There are 4 trains in this plant and the capacity is 1800m³/d (450m³/d × 4trains). Due to strengthening local wastewater regulation of BOD(<20mg/L), They installed 2 membrane modules in 2 trains.The membrane modules easily can be installed in the exsisting tank without remodeling the tank structure because of the compactness.It is possible to operate MBR processes at higher mixed liquor suspended solids (MLSS) concentrations compared to conventional settlement separation systems,thus reducing the BOD compared to exsisting conventional process.

【Photo】

Information

- **Project Name** ····· Meat Processing (Slaughterhouse) Waste Water Treatment Plant
  SHINMEI Co., LTD. / CHIKUSEI Meat Processing Center
- **Location** ····· Chikusei-city,Ibaraki-prefecture,Japan
- **Operation started** ····· April,2014
- **Outline** ····· Meat Processing (Slaughterhouse) Waste Water Treatment Plant
  Mooring Pig:1000head/Plant Mooring Caw:100head/Plant
  Slaughter Pig:1300head/day Slaughter Caw:100head/day
- **OEM** ····· Amesys
- **Capacity** ····· MBR : Total 900m³/d (450m³/d × 2trains)
- **Product Code** ····· STERAPORE 5000 Series
  50M1000FF × 2pcs (Membrane Area: 1000m²/pc)
- **MBR driving force** ····· The Membrane modules easily can be installed in the exsisting tank it without remodeling the tank structure because of the compactness.That's reason why we were awarded.

Design condition

HRT	15days
MLSS(mg/L)	10000
viscosity(mPa･s)	20
Filtration/Relaxation	7min/2min
Flow rate	300L/min･train
Static pressure/ Sucction pressure	Static pressure：-15～18kPa、 Suction pressure：-40kPa
Aeration Volume for Membrane	4.3m3/min
Chemical Cleaning	Maintanance Cleaning NaClO 500ppm 1time/week
	Recovery Cleaning NaClO 3000ppm 2times/month

Water quality

	Raw water	MBR tank	Treated water
BOD(mg/L)	1,000	200	< 20
SS(mg/L)	1,000	250	< 20
n-Hex(mg/L)	120	<10	< 10
Water temparture	27℃ in summer, 18℃ in winter		
pH	7	6.8～7	7

Process flow diaglam

Raw water tank → Screen → EQ tank → Flocculation → 2 of MBR tank(125m3) and 2 of Aeration tank(125m3) → Sedimentation tank

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Plum Processing Waste Water Treatment Plant

Features

This is food (Japanese plum) processing factory WWTP in Japan. Existing sedimentation tank get older and MBR package system is installed in near existing WWTP together with related equipment. After performance confirmation, customer removed old sedimentation tank. This MBR package system is very compact and can be transported by truck. And MBR tank is separeted and compact design. So we can reduce the chemical consumption for membrane soak cleaning.

【Photo】

Information

- **Project Name** ····· Food (Japanese plum) processing factory WWTP / UMETA Co., Ltd.
- **Location** ····· Japan
- **Operation started** ····· Oct. 2015
- **Furnished by** ····· SUNACTIS Co., Ltd.
- **Capacity** ····· 200m³/d (Peak 300m³/d)
- **Product type** ····· 50M0750FF × 1 pc (Membrane Area : 750 m²)
- **Advantage of MBR** ····· No need any construction work and no shutdown of existing WWTP. Eliminate existing sedimentation tank.

Design and Operation Condition

HRT	3days	
MLSS	Aeration tank	15,000mg/L
	MBR tank	17,000mg/L
Filtration／Relaxation	7min/1min	
RAS-ratio	3Q	
Pre-treatment	0.3mm screen	
Aeration volume for Membrane	4.0m3/min	
Chemical Cleaning	Maintanance Cleaning	Every once a week NaCLO 500mg/L
Static pressure/	Soak Cleaning	Every once a half year NaCLO 3,000mg/L
Sucction pressure	−12kPa/−15kPa	

Water quality

item	inlet	Outlet
pH	3.5	7.4
BOD	1500	2
COD(Mn)	1500	7.2
SS	20	0

Process flow daiglam

Raw water tank → EQ tank → Aeration tank → MBR tank → Treated water tank

Enduser's comment

We can improve treated water quality and reduce control item of WWTP. Maintenance become earsier than previous one.

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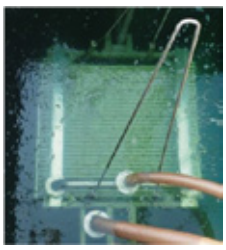
Chemical Plant Wastewater Treatment Plant

Features

Resistant organic substances such as benzene and phenol are contained in wastewater, so anaerobic biological treatment is carried out as pretreatment to improve biodegradability and then highly efficient biological treatment is carried out by membrane bioreactor. By this two-step process, organic matter of raw water is decomposed, and good quality of treated water is obtained. In addition, since this treated water can be discharged to a wastewater treatment plant in an industrial zone, it was possible to reduce the waste solution cost.



【Photo】

Information

- **Project Name** ····· Chemical Plant Wastewater Treatment Facility
- **Location** ····· Taiwan Changhua
- **Operation started** ····· 2016
- **Outline** ····· Wastewater is highly processed by Upflow Anaerobic Sludge Blanket Reactor(UASB) and Membrane Bioreactor(MBR) 2 step process.
- **OEM** ····· Digital Technology Inc., Taiwan
- **Capacity** ····· 600m³/day(25m³/hr)
- **Product Code** ····· STERAPORE PVDF Membrane Element
- **Advantage of MBR** ····· Since the MLSS concentration of the aeration tank can be set high, it is possible to make the aeration tank compact and improve the treated water quality.

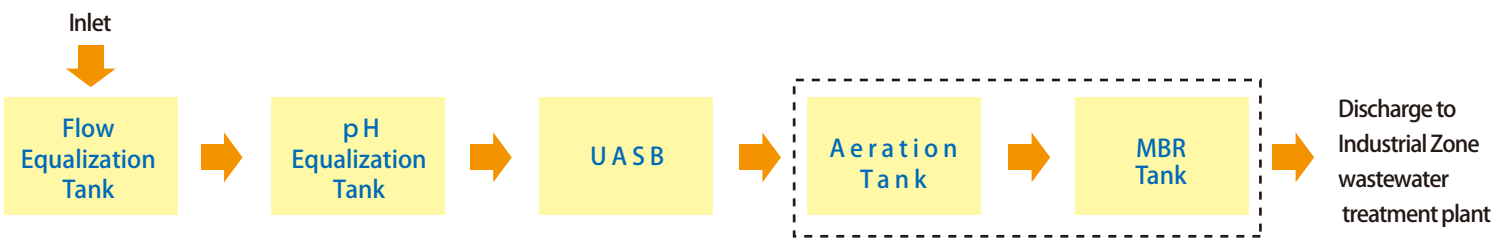
Design condition

HRT (hr)	36	
MLSS(mg/L)	Aeration Tank	4500~6000
	Membrane Tank	5000~8000
Filtration/Relaxation	7min/1min	
RAS Ratio	3	
Pretreatment	UASB	
Trans Membrane Pressure	5~25 kpa	

Water quality

item	inlet	Outlet
pH	5~10	7~8
BOD	600	<20
COD	1200	<50
SS	200	<

Process Flow Diaglam



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Topolcany STP

Features

Total project cost is approx. 45 mil. EUR. It is most biggest municipal wastewater treatment plant with MBR in Slovakia

Information

- **Project Name** ····· Topolcany STP
- **Location** ····· Slovakia
- **Operation started** ····· December 2016
- **Outline** ····· New municipal wastewater treatment plant invested by European Union. Our partner, AWT & Alvest Mont, have a good reputation in Slovakia.Because they have some similar experience with MBR since 2012. So end-user decided to adopt our technology about this project.
- **OEM** ····· AWT Watertreatment B.V.
- **Capacity** ····· 12,000m3/d (500m3/hr)
- **Product Code** ····· 60E0025SA x 800 pcs
- **MBR driving force** ····· Request for safety treated water quality

Design condition

MLSS	Aeration Tank	10,000 mg/L
	Membrane Tank	10,000 mg/L
Filtration/Relaxation	10 min. / 20sec with BW	
RAS ratio	3-4 Q	
Pretreatment	Screen 1 mm	
Aeration volume for membrane	3.9 Nm3/min. for 2,000 m2/module	
Chemical Cleaning	Meintenance cleaning	-
	Recovery cleaning	NaClO 500 -1,000 mg/L, when only TMP increase

Water quality

Item	Inlet	Outlet
pH	6 - 8	-
BOD	300	25 - 30
COD	650	125
SS	200	10
T-N	40	10
T-P	7	1

Process flow diaglam

Rotery Drum Screen → Anoxic Tank → Oxic Tank → MBR Tank → Discharge

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Tilburg WWTP

Features

Probably it is one of the biggest industrial wastewater plant with MBR in Holland

Information

- **Project Name** ····· Tilburg WWTP
- **Location** ····· The Netherlands
- **Operation started** ····· October 2016
- **Outline** ····· There are total four companies in Tilburg industrial park. They are Agristo and Coca Cola and Fuji, Iff. Originally, they discharged wastewater to municipal wastewater treatment plant and paid sewarage charge. They needed to expand capacity. But municipal wastewater treatment could not expand any more. So they decided to build own wastewater treatment plant inside of Tilburg industrial park invested by third party who is one of our partner, AWT. As a result, they could discharge to own wastewater treatment plant at 33% discount price of sewarage charge.
- **OEM** ····· AWT Watertreatment B.V.
- **Capacity** ····· 9,000m3/d (375m3/hr)
- **Product Code** ····· 5CE0025SA x 800 pcs
- **MBR driving force** ····· Request for safety treated water quality and saving space, future wastewater recycling

Design condition

MLSS	Aeration Tank	10,000 mg/L
	Membrane Tank	10,000 mg/L
Filtration/Relaxation	10 min. / 20sec with BW	
RAS ratio	3-4 Q	
Pretreatment	Screen 1 mm	
Aeration volume for membrane	3.9 Nm3/min. for 1,000 m2/module	
Chemical Cleaning	Meintenance cleaning	-
	Recovery cleaning	NaClO 500 -1,000 mg/L, when only TMP increase

Water quality

Item	Inlet				Outlet
	FactoryA	FactoryB	FactoryC	FactoryD	
pH	7	6	7.5-8.0	7	-
BOD	400	-	-	1000	20
COD	1000	1571	38	1700	125
T-N	605	24	1009	35	7.4

Process flow diaglam

Screen 1mm → DAF → Anoxic → Oxic → MBR → Discharge

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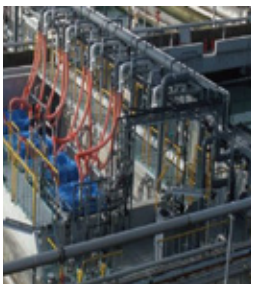
Chemical Waste Water Treatment Plant

Features

This plant manufactures various chemical products. With diversification of production varieties and increased production, it is necessary to raise capacity without increasing the area of existing wastewater treatment facilities. That is why MBR was introduced. By updating the conventional coagulation sedimentation tank, it was introduced without load such as installing a new tank. Also, during the second phase of construction, a small diameter membrane was used to secure space for future capacity enhancement.



【Photo】

Information

- **Project Name** ····· Chemical Waste Water Treatment Plant
- **Location** ····· Otake-city,Hiroshima-prefecture,Japan
- **Operation started** ····· Phase-1, 2013. Phase-2, 2015.
- **Outline** ····· The scale of the facility is large and the capacity is high. Some trains are working with coagulants.
- **OEM** ····· Nippon Rensui
- **Capacity** ····· Treatment by MBR : Total 6,000m³/d
- **Product Code** ····· Phase-1, 25m²/element × 60pcs × 5units
  Phase-2, 40m²/element × 60pcs × 4units
  Total efective membrane surface area 17,100m²
- **MBR driving force** ····· Space saving : MBR can be introduced without enlarging the existing wastewater treatment facility, and even space for future MBR expansion can be secured.
  Energy saving : The 40-square-membrane element introduced during the 2nd phase construction has a footprint equivalent to that of the 25-square-meter membrane element, but the membrane surface area is large, so SADm can be significantly reduced.

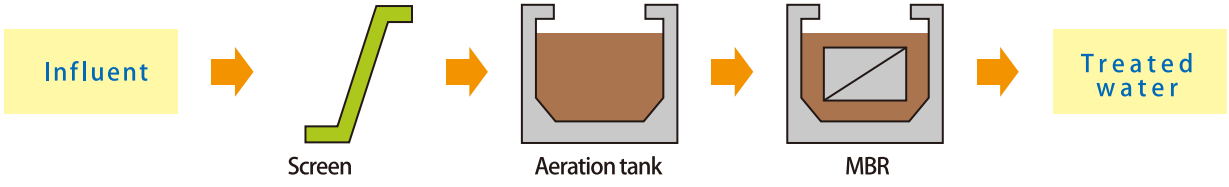
Design condition

HRT	10h
MLSS(mg/L)	6,000～10,000
Filtration/Relaxation	7min/1min
Flow rate	14.6LMH
"Static pressure/ Sucction pressure"	Static pressure：-2～-3kPa
	Suction pressure：-20～-30kPa
Membrane scouring air	8Nm3/min・unit
CIP	Maintanance Cleaning NaClO 500ppm once/week
	Recovery Cleaning NaClO 3000ppm, Citric Acid 1～2wt% Once/4～12months

Water quality

	Raw water	Treated water
BOD(mg/L)	600	< 25
SS(mg/L)	1000	< 3
T-N	240	N/A
T-P	2	N/A
pH	6.6~10	6.6~8

Process How diaglam



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Textile Factory Effluent Treatment Plant in Bangladesh

Features




【Photo】

This is Textile / Dyeing factory ETP (Effluent Treatment Plant) in Bangladesh. Existing ETP plant (Conventional) get shortage of production & treatment capacities as well as to improve treated water quality for the environmental contribution and MBR expansion is installed in next existing ETP in 2016. This is the first MBR ETP plant in Bangladesh and operating proper management and conditions under local EPC.

Information

- **Project name** ..... Knit Concern Limited ETP expansion (from 3,000m³/d to 6,000m³/d)
- **Location** ..... Narayanganj, Bangladesh
- **Operation started** ..... Sep. 2016
- **Furnished by** ..... Charm Ltd.
- **Capacity** 6,000m³/d
- **Product type** ..... 50M1000FF×16pcs (Membrane: Area 16,000m²)
- **Advantage of MBR** ..... Improve Treated Water Quality, Space Saving and Future Wastewater Recycling.

Design and Operation Condition

MLSS (mg/L)	6,000 ppm
Filtration/Relaxation	7 min. /1 min.
RAS Ratio	2Q
Pretreatment	1 mm Drum Screen
TMP	50 ~ 100mbar
Chemical Cleaning	Maintenance Cleaning Every week NaClO 300-500mg/L, Recovery Cleaning Every 3 month NaClO 3,000 mg/L

Water quality

	Inlet	Outlet
pH	8.5 ~ 9	6.5 ~ 7
BOD (mg/l)	250	< 20
COD (mg/l)	800	< 50
TSS (mg/l)	300	< 10

Process flow diagram

Inlet → Screen → Equalization tank → Neutralization → Drum Screen → Aeration tank → Drum Screen → MBR tank → Discharge

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HOLLOW FIBER MEMBRANE MODULE STERAPORE

Water recycling plant in China

CASE 01

Location
China

Furnished by
Beijing Origin Water Technology Ltd.

Capacity
45,000m³/d

Application
Domestic Sewage

Operation started
2006

Product
STERAPORE™ 5000

Challenge

As water shortage in urban areas in China is becoming a serious problem due to growing population in such areas, effective use of treated water is needed as a countermeasure to solve this problem.

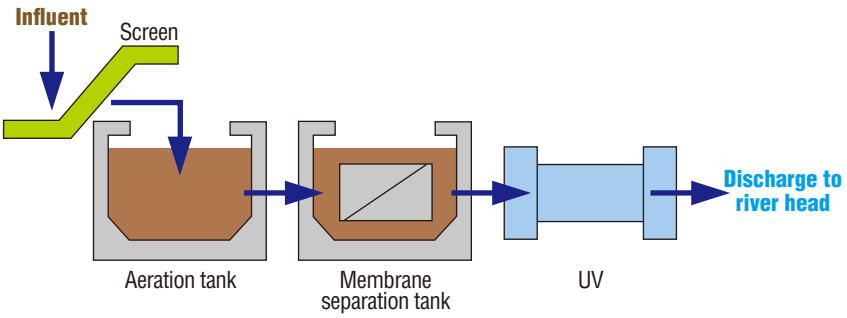
Solution

The purpose of this treatment system is reuse of the treated water, allowing the treated water to be discharged into the upstream of the dam. To this end, MBR that can cut off SS almost 100% to obtain excellent water quality has been used.

Benefits

The sewage treated water by SBR(Sequencing Batch Reactor) is treated by MBR(Membrane Bio Reactor) and then being discharged into the dam serving as a water supply resource.

Process flow diagram



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Sewage treatment plant in Korea

CASE 02

Location
Korea

Furnished by
Hyundai Engineering Co., Ltd.

Capacity
30,000m³/d

Application
Domestic Sewage

Operation started
2008

Product
STERAPORE™ 5000

Challenge

This plant is located near Seoul, a growing megacity with a population of over 10 million, and its treatment capacity needs to be increased from 150,000 to 180,000m³/day; however, there is not enough land space.

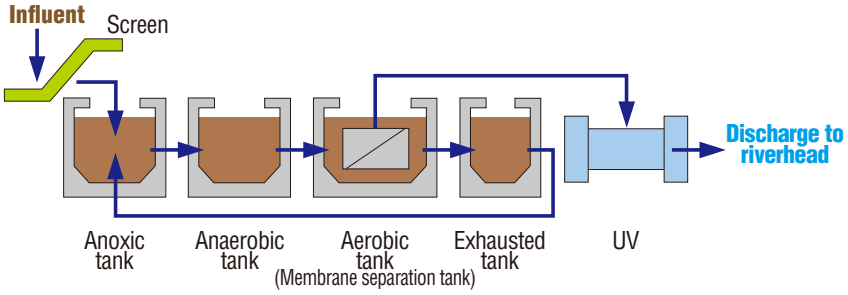
Solution

A significant land-saving is a critical factor for this project. Membrane Bio-Reactor (MBR) can reduce about 60% land space compared with conventional activated sludge process because MBR can eliminate a secondary clarifier.

Benefits

MBR makes it possible to utilize the limited land. Also, the MBR treated water can be discharged to riverhead for improvement in the quality of river water.

Process flow diagram



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Industrial water recycling plant in Japan

CASE 03

Location
Japan

Capacity
720m³/d

Application
As a part of production facility

Operation started
2010

Product
STERAPORE™ 5000

Challenge

Need to reduce industrial water quantity as part of the client's CSR programs.

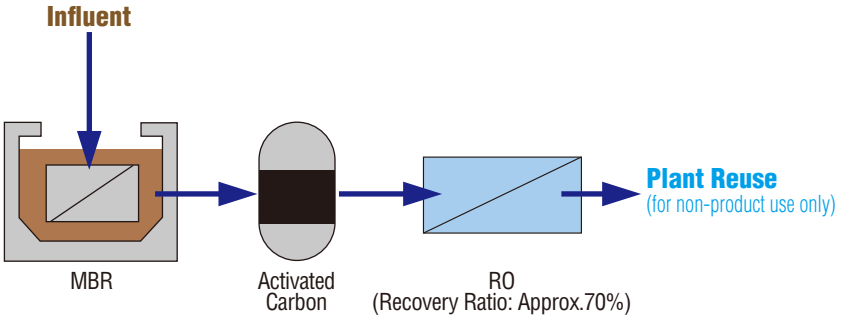
Solution

Reuse a part of the treated water for CIP makeup water and beer bottle container washing using reclaimed water from production lines with Membrane Bio-Reactor (MBR) and Reverse Osmosis (RO) technologies.

Benefits

Lower the client's water and wastewater bills in addition to contribution to their CSR activities.

Process flow diagram



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HOLLOW FIBER MEMBRANE MODULE STERAPORE

Do more with less upgrade of existing MBR

CASE 04

Location
Japan

Furnished by
Atakadaiki Engineering Co., Ltd.

Designed Capacity
420m³/d

Application
Domestic Sewage

Year Operation Started
2011

Product
STERAPORE™ 5000

Challenge

The initially installed MBR system equipped with a flat-sheet membrane was operated at a water flux rate higher than normal to process the influent more than originally planned. This situation brought an unstable MBR system operation such as frequent chemical cleanings and membrane replacements in a shorter period than expected. Therefore, a retrofit of this MBR system with the minimum CAPEX to realize a stable operation and minimize OPEX was highly anticipated.

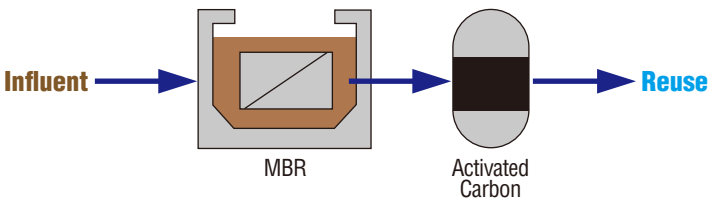
Solution

Replace the flat-sheet membrane module with the STERAPORE™ hollow-fiber membrane module to increase the membrane surface area per footprint to secure a sufficient influent treatment capacity without a tank and blower expansion

Benefits

Through the membrane replacement, the MBR system has gained more capacity under operation at an appropriate water flux rate accompanied by the following cost saving:
CAPEX: No membrane tank and blower capacity expansion
OPEX: Less membrane maintenance and replacement

Process flow diagram



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HOLLOW FIBER MEMBRANE MODULE STERAPORE

Industrial wastewater treatment plant in Korea

CASE 05

Location
Korea

Furnished by
CJ Korea Express Co.

Capacity
1,000m³/day

Application
Industrial Wastewater (Dairy Plant)

Operation started
2008

Product
STERAPORE™ 5000

Challenge

Reduce or eliminate sludge carry-over to the final effluent dealing with significant fluctuations in the inlet water composition.

Solution

Retrofit the existing conventional activated sludge process with Membrane Bioreactor (MBR) featuring the Mitsubishi Rayon hollow fiber membrane.

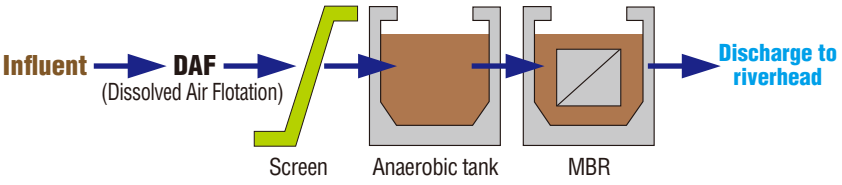
Benefits

Realize hassle-free STP operation and maintenance while getting the better quality final effluent especially in terms of BOD and SS.

Water analysis

		Influent	DAF treated water	MBR treated water
pH		5-10	5-10	**5-10**
BOD_5	mg/L	1,500	500	**<2**
COD_{Mn}	mg/L	600	220	**<10**
SS	mg/L	800	200	**<1**
T-N	mg/L	100	49	**<5**
T-P	mg/L	30	14	**<1**
n-H	mg/L	30	10	**<5**

Process flow diagram



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HOLLOW FIBER MEMBRANE MODULE STERAPORE

Wuxi Xincheng wastewater treatment plant

CASE 06

Location
Jiangsu Province, China

Furnished by
Jiangsu Origin Water Technology Co., Ltd.

Capacity
30,000m³/day

Application
Sewage (30% of Domestic Wastewater and 70% of Industrial Wastewater)

Operation started
2011

Product
STERAPORE™ 5000

Challenge

On June 5, 2008, the newly revised Taihu Lake Water Pollution Prevention Regulation was brought into effect. However, the footprint of this facility was too small to comply with the stringent regulation by increasing of the existing conventional activated sludge process capability without overloading.

Solution

Apply membrane bioreactor (MBR) to meet the effluent standard with the limited land.

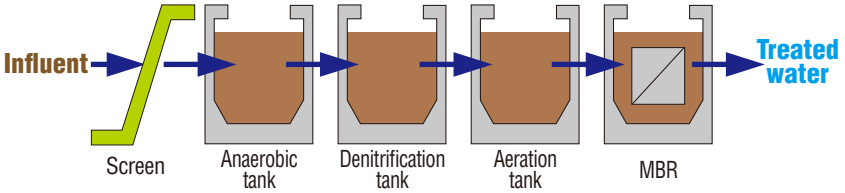
Benefits

Compliance with the standard with no overload concern and less manual operation.

Water analysis

		Influent	Treated water
COD_{Cr}	mg/L	360	**33.2**
SS	mg/L	400	**<5**
T-P	mg/L	5	**0.3**
NH_3-N	mg/L	38	**1.3**
T-N	mg/L	43	**11.1**

Process flow diagram and water quality



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STERAPORE™ 5000 Series

HOLLOW FIBER MEMBRANE MODULE STERAPORE

Petrochemical plant wastewater recycling

CASE 07

Location
Ningbo, China

Furnished by
Mitsubishi Chemical Engineering Co.

Capacity
6,000m³/day

Application
Petrochemical Plant Wastewater

Operation started
2012

Product
STERAPORE™ 5000

Challenge

- Reuse purified terephthalic acid (PTA) plant wastewater as cooling tower makeup to reduce the environmental load associated with effluent disposal and to cut the water bill
- Install all the membrane modules in the existing 10 meter depth tank without a shutdown of the WWTP

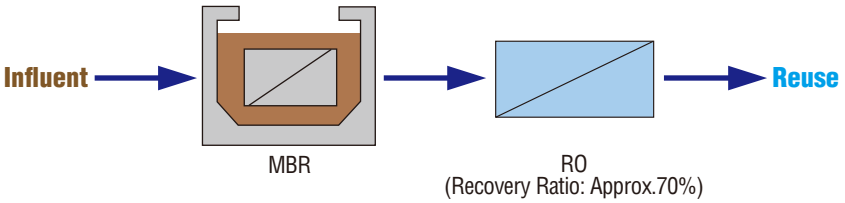
Solution

- Retrofit of the existing WWTP with an MBR-RO system to obtain reusable water for the purpose
- Use of the existing beam to hang membrane modules to eliminate the guide pipe foundation work which requires a WWTP shutdown

Benefits

- Reuse up to 70% of the wastewater (4,200m³/day) as cooling tower makeup
- No WWTP downtime

Process flow diagram



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201307(C)A

STERAPORE™ 5000 Series

HOLLOW FIBER MEMBRANE MODULE STERAPORE

Electronics industry wastewater treatment plant in Vietnam

CASE 09

Location
Vietnam

Furnished by
Goshu Kohsan Co., Ltd.

Capacity
500m³/day

Application
Electronics Industry Wastewater

Operation started
2012

Product
STERAPORE™ 5000

Challenge

This facility is located in a industrial park, Vietnam.
Need to construct the integrated wastewater treatment facility in the industrial park due to lack of capacity. Treated water directly discharge to the river. The criteria is BOD＜24mg/L, COD＜41mg/L.

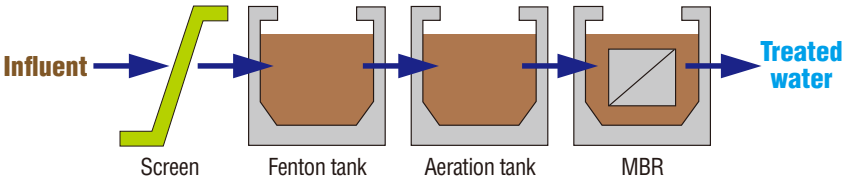
Solution

A treated water high quality is a critical factor for this project. Membrane Bio Reactor (MBR) can adhere the strict effluent standards of this river.

Benefits

The treated water by MBR directly discharge into the river for protecting the environment.

Process flow diagram



MITSUBISHI CHEMICAL GROUP

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STERAPORE™ 5000 Series

HOLLOW FIBER MEMBRANE MODULE STERAPORE

High COD effluent treatment at a chemical plant

CASE 10

Location
Japan

Furnished by
Swing Corporation

Maximum Capacity
700m³/day

Application
Chemical Wastewater

Operation started
2012

Product
STERAPORE™ 5000

Challenge

The raw wastewater is mixed effluent from chemical and pharmaceutical plants.
The wastewater treatment facility cannot stop because the plant is running all year.
The existing settling tank agitator has damaged by aging facility.

Solution

Without stopping the existing facilities, adding a membrane tank, remodifications were carried out. Membrane Bio-Reactor (MBR) was been equipped.

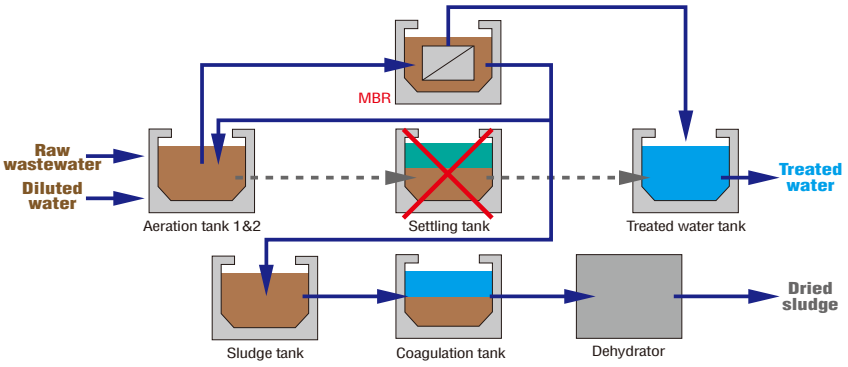
Benefits

MBR does not require settling tank and it also raised load. The water quality of the MBR process is very good and stable. Our client said that 'wastewater treatment by MBR is the best choice' .

Water analysis

		Raw wastewater	Diluted wastewater	MBR treated water
Flow	m³/h	4.0 (2.5～8.0)	16	—
COD	mg/L	8,000 (1,000～15,000)	2,000	**4.9**
T-N	mg/L	500 (0～1,000)	125	—
pH		8.0 (6.5～9.0)	8.0	—
SS	mg/L	—	—	**1.2**

Process flow diagram



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