ARGES
Treatment Machinery Co.

DIFFERENT PROCESSES ALTERNATIVE SOLUTIONS

APPLICATIONS

- Small communities
- Hotels
- Resort areas
- Service stations
- Caravan sites
- Construction sites

ADVANTAGES

- Proven practical and economic solutions
- Flexible to population fluctuations
- Odor free, clog free, quick start up, robust operation
- Minimum attendance
- Excellent treatment efficiency

PACKAGE TYPE TREATMENT PLANTS

PACKAGE TYPE WASTE WATER TREATMENT PLANTS

1 MARTI MBBR
MOVING BED BIOLOGICAL REACTOR

- Small footprint
- Low energy consumption
- Excellent microbial growth
- Quick start up

2 MARTI MBR
MEMBRANE BIOREACTOR

- Compact design
- Efficient screening
- Preassembled, easy to transport
- Smaller area requirement than any other method
- Better effluent quality
- Solid free effluent from the reactor
- Advanced nitrogen and phosphorus removal on demand
- High flexibility due to the modular design

3 MARTI EA
EXTENDED AERATION BIOREACTOR

- Trouble free
- Odor free
- Easy operation
- Low sludge waste
- Stable sludge production

4 MARTI SBR
SEQUENTIAL BATCH REACTOR

- Easy operation
- Simple maintenance
- Economic solution

WASTE WATER INFLUENT PARAMETERS

As standard, all MARTI package plants are designed according to the following influent parameters;

PARAMETERS		VALUE	UNIT
Influent	Q	200	l/PE/day
Total Suspended Solids	TSS	90	gr/PE/day
Biological Oxygen Demand	BOD_5 (mg/l)	60	gr/PE/day
Nitrogen	N	12	gr/PE/day
Phosphorus	P	1	gr/PE/day

EFFLUENT PARAMETERS

As standard, all MARTI package plants are designed to achieve the following effluent parameters;

PARAMETERS		VALUE	UNIT
Total Suspended Solids	TSS	50	mg/l
Biological Oxygen Demand	BOD_5 (mg/l)	30	mg/l

Further enhanced effluent qualities can be achieved upon request.

1 MARTI MBBR MOVING BED BIOLOGICAL REACTOR

All stages used in waste water treatment have been included in MARTI MBBR in which enhanced activated sludge process with moving bed high efficiency biofilm is applied.

Basic steps of treatment;

- Screening
- Nitrification–Denitrification
- Aeration
- Sedimentation
- Disinfection
- Filtration

The process enhances the activated sludge process by providing a greater biomass concentration in the aeration tank and reducing the basin size significantly.

SYSTEM

Coarse Screening-Equalization Tank

The sewage passes through a bar screen or basket screen which separates the particles larger than 20 mm in the sewage to protect the inlet pumps.

Sewage is collected in a customer provided equalization tank which is sufficient to hold the daily peak flow for two hours.

Pumping–Mechanical Screen

The sewage will be taken by submerged sewage pumps to the aeration tank passing through a mechanically cleaned automatic screen which has a mesh size of 3 mm.

Denitrification

Sewage enters the anoxic zone of the plant where it mixes with the return sludge. The special shape of the inlet piping gives an efficient mixing capability and raw water mixes with the return sludge and denitrification occurs in the anoxic zone.

Aeration-Biodegradation

The water then passes to the aeration zone where the dissolved organic matter degrades by oxidation into carbon dioxide and more biomass acts as activated sludge.

Oxygen is supplied to the bacteria by air blowers placed inside the control room and high efficiency disc or plate diffusers at the bottom of the aeration zone.

A suspended, free floating high-efficiency biomedia simultaneously accumulates inside the bioreactor and provides large biofilm surface to the bacteria. As bacteria consume organics from the waste water, they form a layer on specially shaped free floating biomedia.

Sedimentation

Excess sludge can be taken out from the system via automatic valve and can be dewatered by a bag type filter or filter press.

Disinfection

UV disinfection of hypochlorite can be used upon demand.

Filtration

If the water will be used for irrigation purposes or higher efficiencies are required, a sand filter and a micronic filter can be added to the system. The system comprises of an intermediate collection tank, water pumps, high efficiency pressurized sand filter and micronic filter.

WASTE WATER

MARTI MBBR MOVING BED BIOLOGICAL REACTOR

STANDARD EQUIPMENT

The basic system comprises the following parts;

- **Submersible Sewage Pumps**
- **Flow Control Mechanism**
- **Waste Water Treatment Plant**

Denitrification Zone

-Mechanically cleaned automatic screen

Bioreactor Zone

-Free floating biomedia 10% to 70% filling rate
-Diffusers with piping

Settling Zone

-Lamella plate (separator plates)
-Airlift pumps
-Outlet weir
-Scum collector
-Return sludge system

Control Room

-Blower
-Hypochlorite dosing pump
-Electrical control panel
-Phosphorus removal (optional)

OPTIONAL EQUIPMENT

- **Screens**

  -Mechanical or manual bar screen
  -Basket screen

- **Blower (Stand-By)**
- **Filtration System**

  -Intermediate collection tank
  -Manual or fully automatic sand filter
  -Micron filters

- **Disinfection**

  -UV disinfection

- **Dewatering**

  -Bag type filter
  -Filter pres
  -Sludge pump

- **Chemical Dosing Pumps**

  -Chemical phosphorus reduction

MARTI MBBR systems are very flexible and can be customized to meet any specific capacity and effluent requirements.

The table given below shows the standard sizes based on BOD removal.

MODEL	CAPACITY (m^3/day)	DIMENSIONS			INSTALLED POWER (kW)
		LENGTH(m)	WIDTH(m)	HEIGHT(m)	
MARTI 100 MBBR	20	3.0	2.4	3.0	3
MARTI 200 MBBR	40	3.0	2.4	3.0	4
MARTI 250 MBBR	50	4.5	2.4	3.0	5
MARTI 300 MBBR	60	4.5	2.4	3.0	5
MARTI 400 MBBR	80	5.25	2.4	3.0	5.5
MARTI 500 MBBR	100	6.75	2.4	3.0	7
MARTI 750 MBBR	150	6.75	2.4	3.0	8
MARTI 800 MBBR	200	9.00	2.4	3.0	10
MARTI 1000 MBBR	200	9.00	2.4	3.0	10
MARTI 1250 MBBR	250	11.25	2.4	3.0	12
MARTI 1500 MBBR	300	12.75	2.4	3.0	14
MARTI 1750 MBBR	350	13.50	2.4	3.0	14
MARTI 2000 MBBR	400	13.50	2.4	3.0	16

WE KINDLY REQUEST YOU TO CONTACT US FOR INFORMATION ON ANY SPECIFIC REQUIREMENTS

2 MARTI MBR MEMBRANE BIOREACTOR

35 years of package waste water treatment plant experience is now combined with the advanced technology of microfiltration membranes which is the key technology for future waste water treatment.

ADVANTAGES

- Compact design
- Efficient screening
- Preassembled, easy to transport
- Smaller area requirement than any other method
- Better effluent quality
- Solid free effluent from the reactor
- Advanced nitrogen and phosphorus removal on demand
- High flexibility due to the modular design
- Quick and easy installation

MARTI MBR PACKAGE PLANT INFLUENT-EFFLUENT CHARACTERISTICS

PARAMETERS	COD (mg/l)	BOD_5 (mg/l)	TSS (mg/l)
Influent Water	<700	<300	<300
Effluent Water	<30	<5	<1

SYSTEM

MARTI MBR system is a combination of the traditional activated sludge process and a new membrane separation technology.

Coarse Screen and Equalization Basin

Waste water will be collected in an equalization tank which has a capacity to regulate the maximum flow for two hours. Waste water, before it enters into the equalization basin will pass a manually cleaned bar screen with 20 mm bar opening to protect the inlet pumps.

Inlet Pumps

Waste water collected in the equalization basin will be pumped into the MARTI MBR unit by submergible pumps placed in the equalization basin.

Flow Regulator

The flow is regulated by a flow regulator and only the designated flow is taken into the tank, the rest is sent back to the equalization tank.

Fine Screen

Fine screening is achieved by the high efficient submerged screw screen with 2 mm openings.

Denitrification

The mechanically well treated waste water is taken into an anoxic zone where it is fully mixed with the return sludge from the membrane tank.

The anoxic zone is filled with special floating career to obtain a higher biomass concentration in the compartment.

Aeration - MM*STAR Mebrane Modules

The mixture is then taken into the aeration zone where dissolved organic matter degrades by oxidation into carbon dioxide and more biomass acts as activated sludge. Oxygen is supplied to the bacteria by air blowers and high efficient fine bubble plate diffusers at the bottom of the aeration zone. The MLSS concentration of the aeration zone can be taken as 8000-12000 mg/l since there is no need for gravity separation.

MM*STAR membrane modules are fully submerged in the aeration tank and placed in a separate location. MM*STAR membrane modules are continuously cleaned with a cross flow air stream. The air required for cleaning is supplied by a separate blower and coarse bubble diffusers placed below each row of membranes. Contaminants move through the polypropylene filters, the permeate is drawn out by suction pump. The clean water is fed into a small clean water collection tank so this water can be used for backwashing. If required, chemicals may be added into this clean water storage tank in order to clean the filters during the backwashing process.

The MARTI MBR Works in a sequential order Filtrate – Relax – Backwash with air/water which maintains the nex flux at the desired average level during operation.

Membranes should be cleaned from time to time in order to counteract the loss of permeability and to increase the flux when reduced to a certain amount.

Trans Membrane Pressure is the only mean that you can use to judge whether the membranes need cleaning. A maximum of 300 mbar differential pressure is a clear sign of membrane washing.

In-situ CIP cleaning

Chemicals such as NaClO with 0,5% concentration can be added to the clean water tank in order to clean the membranes when they are backwashed.

Citric Acid, Hydrogen Peroxide and Sodium Hydroxide can also be used.

Ex-situ COP Cleaning

After aeration of the membranes for a certain time, the modules from the tank can be lifted and submerged it into NaClO with 0, 5% concentration for 1 hour, than the membranes can be soaked into NaOH solution with 5% concentration for 2 hours. Before allocating the MMSTAR membrane module be sure to soak it with fresh water.

Full Automation (SCADA and Remote Control)

MARTI MBR plants can be operated with minimal assistance. It can be operated by SCADA system including online effluent analyzer. The plant may be equipped with a touch panel for convenient control.

MARTI MBR units can be completely remote controlled without anyone is present on site.

The table given below shows the standard sizes based on BOD removal.

MODEL	CAPACITY (m^3/day)	DIMENSIONS			INSTALLED POWER(kW)
		LENGTH(m)	WIDTH(m)	HEIGHT(m)	
MARTI 100 MBR	20	6.75	2.4	3.0	3
MARTI 200 MBR	40	7.50	2.4	3.0	4
MARTI 300 MBR	60	8.25	2.4	3.0	5
MARTI 400 MBR	80	9.00	2.4	3.0	5.5
MARTI 500 MBR	100	9.75	2.4	3.0	7
MARTI 750 MBR	150	10.50	2.4	3.0	8
MARTI 1000 MBR	200	11.25	2.4	3.0	10
MARTI 1500 MBR	250	12.00	2.4	3.0	12
MARTI 1250 MBR	300	13.50	2.4	3.0	14

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MARTI EA
EXTENDED AERATION BIOREACTOR 3

MARTI EA systems are very easy to operate and produce less and stable sludge than other processes. Extended aeration systems are very stable against flow fluctuations. They cover big foot print because of the long retention time in the aeration basin.

The table given below shows the standard sizes based on BOD removal.

MODEL	CAPACITY (m^3/day)	DIMENSIONS			INSTALLED POWER(kW)
		LENGTH(m)	WIDTH(m)	HEIGHT(m)	
MARTI 100 EA	20	3.75/4.50	2.4	3.0/2.4	3
MARTI 200 EA	40	7.50/9.00	2.4	3.0/2.4	4
MARTI 300 EA	60	8.75/9.75	2.4	3.3/3.0	5
MARTI 400 EA	80	8.00/13.00	3.6/2.4	3.3/3.0	5.5
MARTI 500 EA	100	9.75/16.50	3.6/2.4	3.3/3.0	7
MARTI 750 EA	150	14.60/24.00	3.6/2.4	3.3/3.0	8
MARTI 1000 EA	200	19.50/32.50	3.6/2.4	3.3/3.0	10
MARTI 1250 EA	250	24.50/40.50	3.6/2.4	3.3/3.0	12
MARTI 1500 EA	300	29.25/48.50	3.6/2.4	3.3/3.0	14

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4 MARTI SBR SEQUENTIAL BATCH REACTOR

The Sequential Batch Reactor (SBR) is an activated sludge process designed to operate under non-steady state conditions. A SBR operates in a true batch mode with aeration and sludge settlement both occurring in the same tank. The major differences between SBR and conventional systems are that the SBR tank carries out the functions of equalization aeration and sedimentation in a time sequence rather than in the conventional space sequence of continuous-flow systems. In addition, the SBR system can be designed with the ability to treat a wide range of influent volumes whereas the continuous system is based upon a fixed influent flow rate. Thus, there is a degree of flexibility associated with working in a time rather than in a space sequence.

The table given below shows the standard sizes based on BOD removal.

MODEL	CAPACITY (m^3/day)	DIMENSIONS			INSTALLED POWER(kW)
		LENGTH(m)	WIDTH(m)	HEIGHT(m)	
MARTI 100 SBR	20	4.50	2.4	3.0	3
MARTI 200 SBR	40	6.75	2.4	3.0	4
MARTI 300 SBR	60	7.50	2.4	3.0	5
MARTI 400 SBR	80	8.25	2.4	3.0	5.5
MARTI 500 SBR	100	9.00	2.4	3.0	7
MARTI 750 SBR	150	10.50	2.4	3.0	8
MARTI 1000 SBR	200	11.25	2.4	3.0	10
MARTI 1250 SBR	250	13.50	2.4	3.0	12
MARTI 1500 SBR	300	13.50	2.4	3.0	14

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PACKAGE TYPE POTABLE WATER TREATMENT PLANTS

APPLICATIONS AND ADVANTAGES

- Small communities and villages
- Construction sites
- Military camps and farms
- Proven practical and economic solutions
- Extremely compact and efficient
- Safe and hygienic
- Flexible to population fluctuations
- Quick start-up, robust operation
- Minimum attendance
- Excellent treatment efficiency

POTABLE WATER

1 AQUAPAK/A-B

This unit has the following processes;

- Flocculation
- Sedimentation
- Sand filtration
- Disinfection
- Activated carbon filter (B)

The water pumped from the source will be mixed with a flocculation agent being alum as standard and the flock will be settled in the sedimentation part. The clarified water then will pass from a sand filter which operates automatically and disinfected with chlorine. The result is removal of turbidity and color so that the water is clear and colorless.

SYSTEM

AQUAPAK/A-B package type drinking water treatment plants are installed in containers and they are almost ready to operate. All surface waters except salty water can be treated in the system. Depending on the analysis of the water to be treated A or B type maybe installed. Further explanation and selection of the type to be used can be selected after studying the complete analysis of the water to be treated.

EQUIPMENT

The basic system comprises the following parts;

Complete mild steel tank including

- Static mixer
- Flocculation
- Alum dosing tank
- Alum dosing pump
- Chlorination storage tank
- Chlorination dosing pump
- Flocculation with mechanical mixer
- Sand filter feed pump
- Sand filter
- Chlorination / UV disinfection system
- Compressor
- Electrical control panel
- Activated carbon filter (B)
- Micronic filter (B)

OPERATION

Surface water will be pumped to the container by submersible drainage pump. The chemicals are dosed to the water and it is taken to the specially designed coagulation flocculation unit. Water passes to the sedimentation tank and the intermediate collection tank.

From the intermediate collection tank the water is pumped via mono block pumps to sand filter, activated carbon filter and micronic filter depending on the type selected. Water then passes through chlorination system or UV lambs for disinfection and is ready to use. System can be controlled by a PLC and each equipment can have a stand by alternative.

POTABLE WATER

AQUAFILT 2

This unit has the following processes;

- Fine filtration
- UV disinfection

The water pumped from the source maybe contaminated with the residues in the long pipe lines. The water before it is delivered to the end user will pass a series of micro filtration, controlled chlorine injection and final UV disinfection. The result is removal of particles and residuals in long pipelines, disinfection for safe drinking water. AQUAFILT will be a perfect solution before the water reaches to the final consumer.

SYSTEM

AQUAFILT is a portable filtration and disinfection system which can be immediately put into operation. The water pumped from the source is directly coupled to the AQUAFILT and the system runs automatically, filters the water down to 2 micron, disinfect the incoming water with high efficiency UV filtration equipment and delivers safe and germ free water to the end user.

EQUIPMENT

The basic system comprises the following parts;

- Prechlorination
- 2 lines of 50/20 micron filtration depending on the influent water quality
- 2 lines of 5/2 micron filtration
- 2 lines of full automatic high efficiency UV disinfection

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