



MBR Plant

**Air blower**

Air blower is required for the operation of the oxic tank unit. Air blower continuously feeds air to the air diffusing device of the membrane unit to supply oxygen required for cleaning the surface of the membrane and also for biological treatment.

**III. Sludge holding tank (can be provided by The Buyer)**

Sludge generated from MBR plant is evacuated to the sludge storage tank. The sludge can be used as excellent agriculture manure for landscaping, gardening, agricultural produce, etc.

**IV Treated water tank (can be provided by The Buyer)**

Treated water tank will hold the treated water to be evacuated according to the Buyer's frequency of use.

**Advantages of using Canadian Crystalline 'Silver Stream' MBR**

- 1) The wastewater transportation cost from the facilities to municipality's sewage treatment plant can be reduced.
- 2) Since wastewater is treated by 0.2 µm membrane, treated water may be used for toilet flushing, irrigation, car washing, curing water for concrete works and so on. Fresh water feed for these purposes can be saved. Since treatment plants can also be transported loaded on a trailer, they can be used for other locations and construction sites.
- 3) In residential areas where sewer pipes are not connected, domestic wastewater generated must be vacuumed on to tanker trucks to a public sewage treatment plant for further treatment. Treatment of wastewater by the MBR reduces the amount of wastewater (sludge) to be brought out to approximately one fourth (1/4) thus reducing cost

Canadian Crystalline "Silver Stream" MBR uses less electricity consumption, in comparison with activated sludge process systems, thereby reducing the power cost.

**Noodle type membrane**



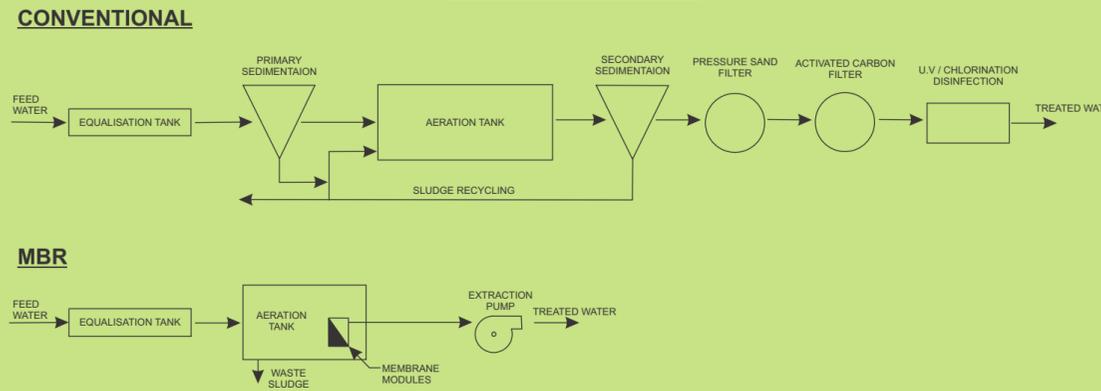
**TECHNICAL DATA OF CC 'SILVER STREAM' MBR**

SI.No.	DESCRIPTION	UNIT	5 KLD	10 KLD	20 KLD	35 KLD	50 KLD	75 KLD	100 KLD
1	TREATMENT CAPACITY	m <sup>3</sup> /day	5	10	20	35	50	75	100
2	AVERAGE FLOW RATE	m <sup>3</sup> /hr	0.25	0.5	1	1.75	2.5	3.75	5
3	FLOOR AREA REQUIRED FOR PLANT INSTALLATION	m x m	1.0x1.5	1.5x1.5	1.8x2.0	2.3x2.3	2.7x2.7	3.2x3.5	3.6x3.8
4	VOLUME OF RAW WATER COLLECTION SUMP	m <sup>3</sup>	2	4	8	14	20	30	40
5	VOLUME OF TREATED WATER COLLECTION SUMP	m <sup>3</sup>	2	4	8	14	20	30	40
6	POWER CONSUMPTION	kW	5	9	9	10	15.5	17	23

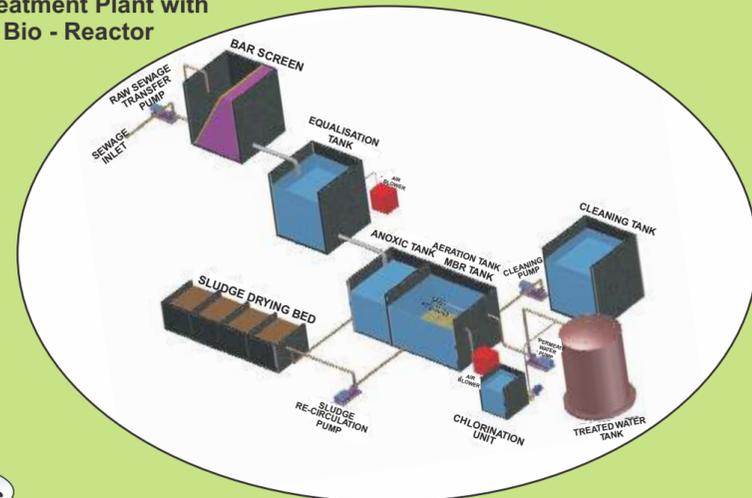
\* HOURS OF OPERATION : 20 Hrs

\* Larger capacities above 100 KLD are also available in our range.

**MBR Vs CONVENTIONAL**



**Sewage Treatment Plant with Membrane Bio - Reactor**



*Silver Stream*<sup>®</sup>



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 GREENER WORLD**  
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*Silver Stream*<sup>®</sup>

**L**ess Space  
 ow Cost  
 ow Power  
 ow Maintenance

**MBR  
 Technology**



## Canadian Crystalline 'Silver Stream' At a Glance

Far more precious than gold or silver, a little more crucial than petrol and as vital as oxygen, yes, we're talking about water. We know that 75% of the world's fresh water resources are contaminated, the remaining is fast disappearing. Soon how well we survive will depend on how well we conserve water. Thankfully technology has advanced enough to offer us choices in water conservation.

One of the most reliable way to do today is by recycling water. We at Canadian Crystalline "Silver Stream" present you a reliable method to recycle water through our superior, pre-fabricated packaged waste water treatment plants. These plants have the capacity to completely treat and cleanse waste water and make it suitable for various activities like Landscaping, Floor Washing, Gardening, A/C Cooling Tower and Toilet Flushing applications. They truly lend a helpful hand in reducing the load on natural water resources.

Canadian Crystalline newly developed technology has resulted in machines with better efficiency, less power consumption and is more compact in terms of size and weight.

## About our Canadian Crystalline 'Silver Stream' MBR

1) The Membrane Bio-Reactor unit (hereinafter referred to as "MBR") can treat domestic wastewater generated from

✓ Residential Apartments	✓ Commercial Complex	✓ Labour Camp / Defence / Refugee Camps
✓ Public Amenities / Convenience	✓ Factories / Industries	✓ Resorts & Clubs

2) Canadian Crystalline "Silver Stream" MBR is "Low maintenance cost" "Space saving" "low initial cost" advanced water treatment system, by combining active sludge treatment and submerged Membrane Bio-reactor Systems.

3) Canadian Crystalline "Silver Stream" MBR adopting membrane filtration process requires less space and yet provides higher treatment performance compared with the conventional treatment systems. That is why the MBR is ideal for places with limited space, and for recycling of treated water for drip irrigation, landscaping, toilet flushing, road compacting, curing of concrete, etc.

4) Raw sewage treatment capacity: from 10 KLD to 100,000 KLD OR 10 m<sup>3</sup>/day to 100,000 m<sup>3</sup>/day are available in the range of Canadian Clear "Silver Stream" Systems.

5) Canadian Clear "Silver Stream" MBR sets 2 or 3 membrane modules in a vertical formation, containing multiple membrane modules. Pumping wastewater through the membranes effectively treats the water. Sludge clogging on membrane surface is greatly reduced as air is constantly scored from beneath the membrane module.

## Features of Advanced Technology Canadian Crystalline 'Silver Stream' MBR

### 1) Easy Operation and Low Maintenance Cost

- Clog-resistant: Noodle type membrane design
- Easy inspection: as membrane modules are noodle type
- The membrane-based solids-liquid separation ensures easy maintenance hence no need to pay attention to Sludge control and sedimentation.
- Periodical maintenance for membrane is only one cleaning by dosing chemical solution once in three (3) Months.
- Operation and maintenance for MBR is very simple.

### 2) Space saving (Low footprint)

- Operating with a high concentration of Mixed Liquor Suspended Solids (MLSS), the MBR process requires only a smaller reaction tank and does not require settling tank or sludge thickening tank. Therefore, the required area for Canadian Crystalline "Silver Stream" MBR process will be one fourth (1/4) of the activated sludge process.
- Canadian Crystalline "Silver Stream" MBR, when catered to large sewage treatment for cities and municipalities saves space, thus reducing the cost of the project drastically, as worldwide the real estate value is escalating to unprecedented levels.

The retention time for the treatment is considerably reduced compared to Activated Sludge Process. Thus the Canadian Crystalline "Silver Stream" MBR is a compact design.

### 3) Low Cost

Simple and compact design leads to initial cost savings, reduces sludge disposal cost as less sludge is produced.



### 4) High Reliability

Canadian Crystalline "Silver Stream" MBR uses PVDF membranes made with advanced resin processing technology.

### 5) Energy saving

Blower energy requirements are lowered by positioning the membrane modules in a vertical formation to reduce the volume of pumped air required to clean the membrane Surfaces.

### 6) High quality treated water

As wastewater is filtered by membrane with pore size of 0.2 µm, the treated water can be used for drip irrigation, landscaping, toilet flushing, road compacting, curing of concrete, etc. The treated water can also be used for industrial purpose and also for air-conditioning cooling. MBR system is capable of removing Phosphorus and Nitrogen in 6 hours retention time. MBR is capable of removing Coliform Bacteria and all biological contamination by high rate activated sludge. The treated water has no smell. With the conventional activated sludge process, the quality of treated water tends to deteriorate due to insufficient sludge sedimentation (caused by bulking, etc.) On the other hand, no such problems occur to the MBR process because the sludge is separated by membrane filtration.

Items	Unit	Raw Water	Treated Water
BOD	mg/l	150 to 300	30mg/l or less
SS	mg/l	150 to 400	10mg/l or less



### 7) Movable unit

Canadian Crystalline "Silver Stream" MBR up to 100 KLD capacity can be transported because of its compact size, hence it can be transported to other sites after project termination and can be reused.

### 8) Easy installation

Since Canadian Crystalline "Silver Stream" MBR is a prefabricated plant, only joints, piping and wiring works are required at site. Therefore, installation work is easy and installation period is short.

### 9) Less sludge volume

Volume of generated sludge will be reduced to one fourth (1/4) compared with Activated Sludge Process. MBR is operated in conditions of high concentration of MLSS, thereby producing less sludge.

## Canadian Crystalline 'Silver Stream' System Configuration

### 1. Features of process

MBR (Membrane Bio-reactor) is a process that combines a membrane filtration process and activated sludge process. The MBR process does not require secondary clarifies and sand filters used for tertiary treatment in the conventional activated sludge process.

### 2. Facilities:

#### I. Primary Treatment facilities:

Raw water septic tanks (can be provided by the Buyer) The existing septic tanks serve as an equalization tank to provide constant flow to MBR System.

#### Raw water pump

One Raw water submersible pump will be installed in the raw water septic tank / Equalization Tank . The sewage water is collected in the raw water septic tank / Equalization Tank after passing it through the inlet screen. The pump is operated automatically according to the water level in the anoxic tank.



#### Inlet fine screen

The inlet fine screen is installed on the Equalization Tank. The slit size of the screen is 6 mm. The screen removes fine substances contained in the wastewater such as toilet paper, hair, etc. to prevent clogging and/or scratching of membrane. Screened water flows to the Equalization Tank by gravity. Screenings are scraped automatically / manually and discharged.

## II. Membrane Bio-reactor Facilities (MBR System)

The Membrane Bio-reactor Facilities (MBR System) consist of an Anoxic Tank followed by an Oxidic Tank with a membrane unit.

The facility has 2 major functions. One is to remove organic content within the sewage water (BOD) by activated sludge method. The activated sludge process injects oxygen into the reaction tank to make aerobic micro-organisms grow within the tank, and make those micro-organisms digest and thus remove the organic content (BOD) within the sewage water.

The organic matter is partly digested to generate carbon dioxide, and partly used to grow bacteria.

The MLSS of the conventional activated sludge system is approximately 3 - 4 g/l., while that of the MBR system is 7 - 20 g/l., and that is why the micro-organisms concentration can be maintained at high level. The time required for treatment can thus be reduced to approximately 30% of the conventional system.

The other function is to separate solids from liquid using a membrane filter. This process removes the Suspended Solids (SS) within the sewage water by membrane filtering, since the pore size of the membrane is as fine as 0.2 µm. In addition, since the membrane unit is installed immersed within the reaction tank, the gravity sedimentation tank required for conventional systems is eliminated.

#### Anoxic Tank and Oxidic Tank:

The Anoxic Tank receives flow from the equalization tank, either by gravity or by pumping. Anoxic tank consists of an Agitator / Mixer for constant churning of the mixed effluent. At the same time, bacteria nitrifies the ammonia to nitrogen contained in the wastewater.

The oxidic unit consists of an oxidic tank, membrane unit, and filtered water pump.

The wastewater is pre-screened with the inlet screen and is fed to the anoxic tank. The retention time in the oxidic tank is approximately 4 to 6 hours. BOD is removed by aerobic micro-organisms, which is maintained by high concentration of MLSS.

After these biological treatments are completed, solids-liquid separation is performed through the membrane unit installed within the oxidic tank. The filtrate is discharged as treated water with the filtered water pump. The filtered water pump is automatically operated according to the water level within the oxidic tank.

The membrane unit consists of a membrane module for filtering and the air diffusing unit that feeds air for washing the surface of the membrane module. The air fed from the air diffusing device cleans the surface of the membrane and at the same time provides oxygen required for biological treatment. The sludge generated within the reaction tank is discharged manually with the excess sludge valve discharge to the sludge storage tank.

