

**Give water a second life**



**Sewage Recycling Plants**

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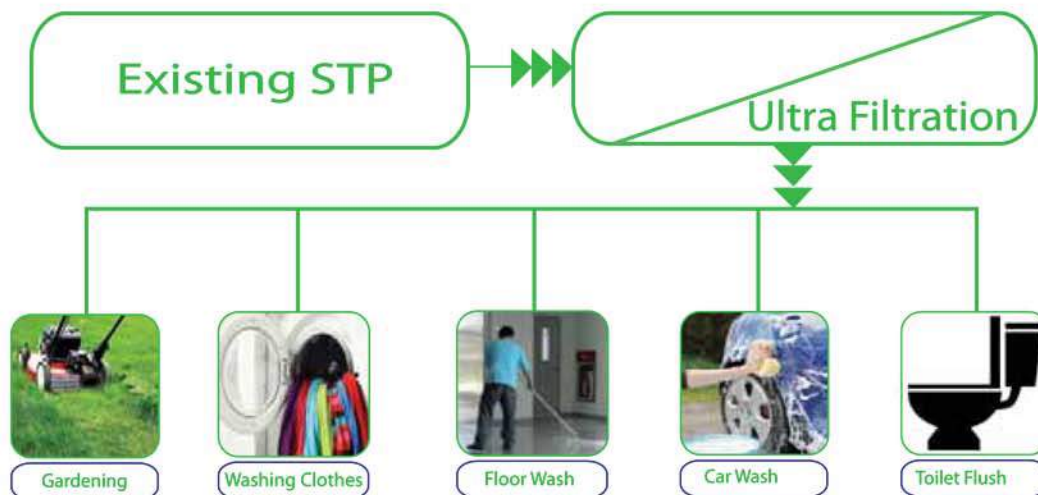
## Why recycle treated sewage ?

Water is a precious resource. We traditionally use it once and dispose of it through our sewage treatment plants. **There may be shortage of fresh water; but there will be no shortage of wastewater.** Recycled water is a reliable source of water. Recycling water reduces the demand for fresh water. Recycling contributes to the conservation of drinking quality water, improves the reliability of our water supplies, frees up water for the environment and reduces the amount of treated water discharged into our water bodies and the ocean. There are many activities that do not require high / drinking quality water and could use recycled water (e.g. gardening and toilet flushing). Treated sewage is too good to just throw away. 'Recycled water' generally refers to fully treated water from sewage treatment plants.



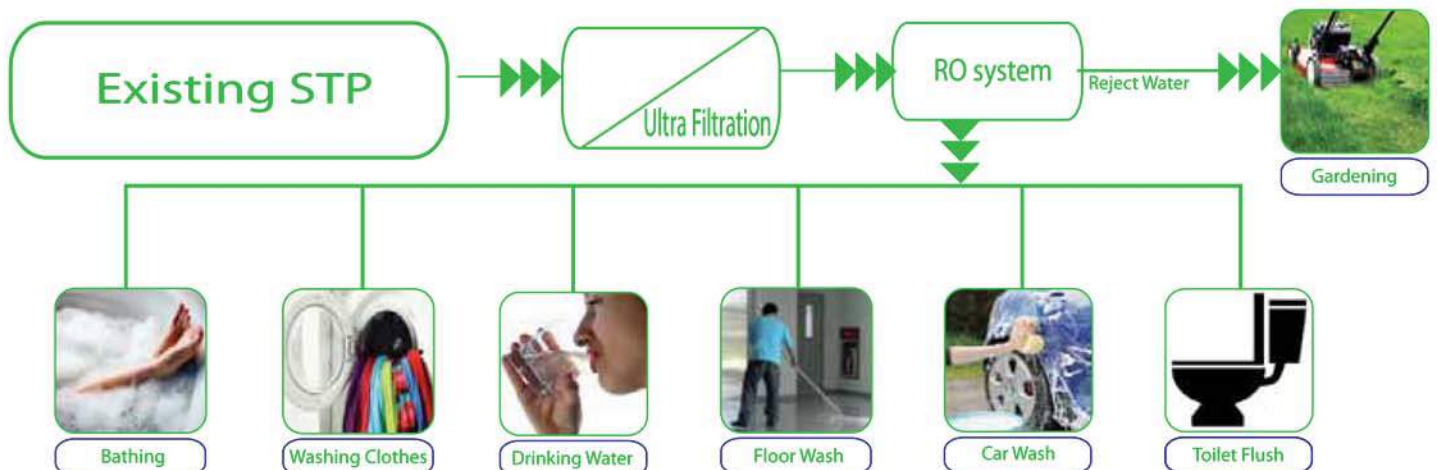
Biologically treated sewage carries with it lots of micro-organism, suspended solids and pathogens that have to be removed before any re-use. The processes used are called 'Tertiary Treatment'. Sewage can be treated to the desired standards based on the need. For irrigation simple filtration and dis-infection is sufficient while for use in toilet flushing and cooling towers, it has to be further processed with Ultra-Filtration. Using advanced technologies like Reverse Osmosis, treated sewage can be purified to drinking water standards.

## Technology Options - Ultra Filtration



Check out video "how ultra filtration works" : [www.modernstp.com/packaged-plant.php](http://www.modernstp.com/packaged-plant.php)

## Technology Options - Reverse Osmosis



Check out video "how Reverse Osmosis works" : [www.modernstp.com/packaged-plant.php](http://www.modernstp.com/packaged-plant.php)

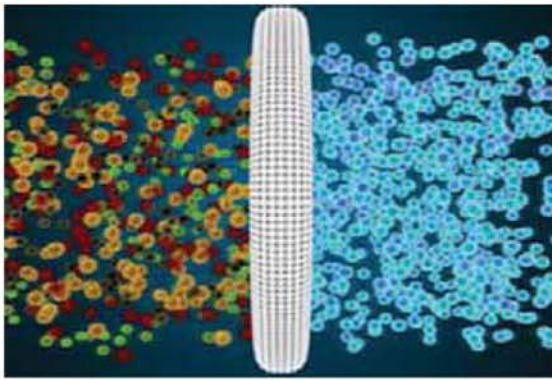
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For More Details : <http://www.modernstp.com/recycle.php>

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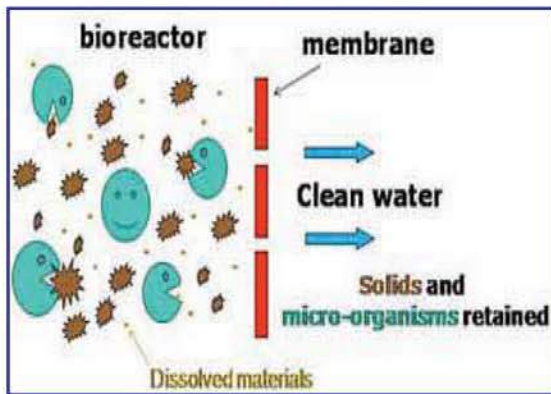
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# Indus - Ultra Filtration Plant / Membrane Bio Reactor ( MBR )



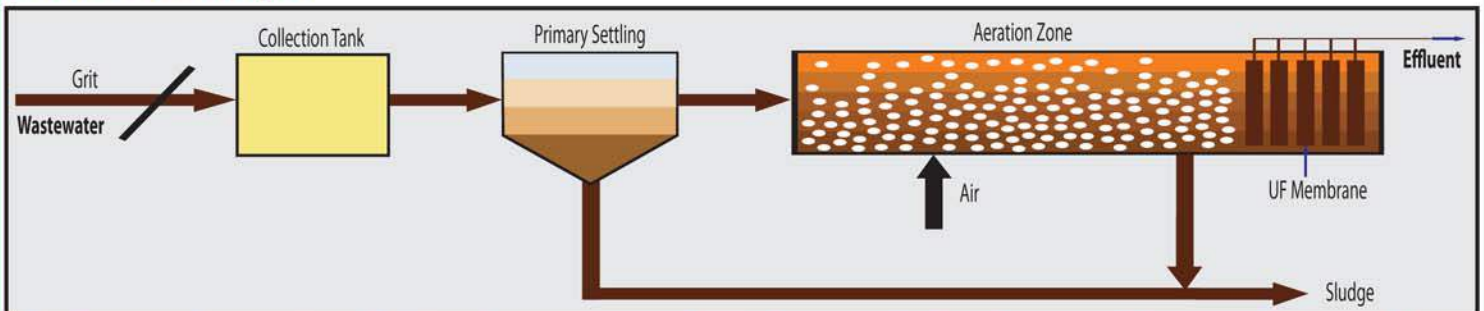
## What is ultra-filtration

Ultra-filtration (UF) is a type of membrane filtration in which hydrostatic pressure forces a liquid against a semi-permeable membrane. A semi-permeable membrane is a thin layer of material capable of separating substances when a driving force is applied across the membrane. Ultra-filtration uses hollow fibers of membrane material and the feed water flows either inside the shell, or in the lumen of the fibers. Suspended solids and solutes of high molecular weight are retained, while water and low molecular weight solutes pass through the membrane. Ultra-filtration is similar to reverse osmosis, except in terms of the size of the molecules it retains. When strategically combined with other purification technologies in a complete water system, UF is ideal for the removal of colloids, proteins, bacteria, pyrogens, proteins, and macromolecules larger than the membrane pore size from water. The primary removal mechanism is size exclusion, though surface chemistry of the particles or the membrane may affect the purification efficiency. Membrane Bi Reactor (MBR) is a combination of biological activated sludge treatment processes and physical filtration using membranes. It produces high quality treated water. Other advantages of MBRs over conventional processes include crystal clear output water, small footprint, low BOD, Nitrogen, Phosphorus and high degree of disinfection. It also produces high quality water consistently.



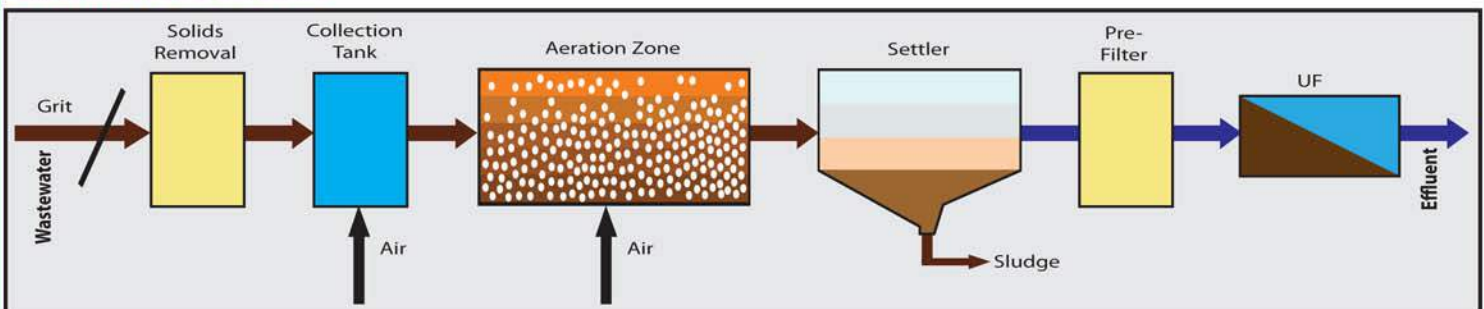
Two MBR configurations exist: internal/submerged, where the membranes are immersed in and integral to the biological reactor; and external/side stream, where membranes are a separate unit process requiring an intermediate pumping step.

## Internal / submerged



The filtration element is installed in either the main tank. Membrane can be flat sheet or tubular or combination of both, and can incorporate an online backwash system which reduces membrane surface fouling by pumping membrane permeate back through the membrane. In systems where the membranes are in a separate tank to the individual trains of membranes can be isolated to undertake cleaning regimes incorporating membrane soaks, however the biomass must be continuously pumped back to the main reactor to limit MLSS concentration increase. Additional aeration is also required to provide air scour to reduce fouling. Where the membranes are installed in the main reactor, membrane modules are removed from the vessel and transferred to an offline cleaning tank.

## External / side stream



The filtration elements are installed externally to the reactor, often in a plant room. The biomass is either pumped directly through a number of membrane modules in series and back to the , or the biomass is pumped to a bank of modules, from which a second pump circulates the biomass through the modules in series. Cleaning and soaking of the membranes can be undertaken in place with use of an installed cleaning tank, pump and pipe work.

Indus specializes in design and execution of MBBR STP with UF / Side stream MBR.

## Technical Specifications

Biologically treated sewage coming from settling tank will be made to pass through a properly designed Ultra Violet dis-infectant for killing pathogens. More resources:

Specifications	25 KLD	50 KLD	100 KLD
Feed Pumps	: One duty	One duty	One duty
Feed Pump capacity	: 0.375 Kw	0.8 Kw	1Kw
Backwash Pump capacity	: 1.2Kw	1.5Kw	2.2Kw
SS 304 CIP Pump capacity	: 0.375 Kw	0.8 Kw	1.0 Kw
Pumps Make	: DAB / Grundfos / Eq	DAB / Grundfos / Eq	DAB / Grundfos / Eq
Dual Media Filter	: 16x65	24x72	36x72
Activated Carbon Filter	: 16x65	24x72	36x72
Inlet / outlet size	: 3/4"	1"	1.5"
Maximum hourly flow	: 1500 Lts per hour	2500 Lts per hour	2500 Lts per hour
Type of valves	: Automatic	Automatic	Automatic
UF Membrane Size			
UF MWCO	:	100 KD	
Flow Configuration	:	Inside out- Dead End	
Origin of UF Membrane	:	Imported	
Chlorine Tolerance	:	Up to 5 PPM continuous	
Control Panel	:	Fully automatic with micro-processor	
Additional accessories	:	Tank level sensors for raw & treated water	

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## Advantages

- 👍 Fully automatic operation
- 👍 Low Cost - Micro Controller Automation
- 👍 Easy To Programm - Simple To Operate
- 👍 Compact design - Small foot print
- 👍 Low Pressure operation
- 👍 Low energy consumption
- 👍 100% Colloidal / Particle removal
- 👍 Bacteria & Virus removal
- Chemical free ( No coagulants, flocculates, disinfectants, pH adjustment)



### Advantages of side stream MBR over submerged MBR:

- Low capital cost
- Lower membrane replacement cost
- No air scouring required – Saves energy
- No sludge re-circulation required- saves energy
- Low maintenance cost
- Higher flux
- Simple automation
- Membrane performance independent of biological system performance
- Easy to clean
- Option to operate in dead-end mode or cross flow mode
- Can be retro-fitted to an existing Biological STP



**INDUS ECOWATER**  
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