Energy and Resource Efficiency in Sustainable Wastewater Treatment

Sustainable Wastewater Treatment using different Aerobic & Anaerobic Treatment Technologies & Introduction to the Environmental Balance Improvement Device
We treat Water!!

- Ground Water
- Surface Water
- Waste Water
- Grey Water
- Sewage

Core Competencies:
- Low Cost Solution
- Bio-augmentation
- Specialized Skid Mounted Equipment

Technologies we offer:
- Anaerobic (HRFD, UASB)
- ASP, FAB, SAFF & RBC
- RO, DM & Ultrafiltration

Services:
- FPC
- DBO
- Turnkey Project
- O&M

Executed more than hundred Projects of Water & Waste Water Treatment in the last five years with various Residential & Commercial Complex, Shopping Malls, Hotels, Resorts, Clubs & Spas, Hospitals, Industries, PSU, MoEF Govt. of India & West Bengal.

We also design & supply packaged skid mounted units for waste water treatment.

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Phone: 3296 4771 4000 4624 4000 4625
www.unitechwater.net
Our Packaged Skid Mounted STP

Flow up to 250 m³/d
➢ Using MBBR technology

### Extended Aeration/MBBR Based packaged skid mounted Sewage Treatment Plant

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Plant Capacity (cum)</th>
<th>Area (sqm)</th>
<th>Thickness of plate along with FRP</th>
<th>Mechanical &amp; Electrical Items along with skid mounted unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bar screen</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>5.4 m (L) x 2.6 m (W) x 3.1m (H)</td>
<td>(5mm+2mm)</td>
<td>✓</td>
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<tr>
<td>2</td>
<td>50</td>
<td>3.9m (L) x 3.15m (W) x 3.1m (H)</td>
<td>(5mm+2mm)</td>
<td>✓</td>
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<tr>
<td>3</td>
<td>75</td>
<td>5.8 m (L) x 3.2 m (W) x 3.1m (H)</td>
<td>(5mm+2mm)</td>
<td>✓</td>
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<tr>
<td>4</td>
<td>120</td>
<td>7.17m (L) x 3.37 m (W) x 3.1m (H)</td>
<td>(5mm+2mm)</td>
<td>✓</td>
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<tr>
<td>5</td>
<td>150</td>
<td>9.8 m (L) x 3.5 m (W) x 3.1m (H)</td>
<td>(5mm+2mm)</td>
<td>✓</td>
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<tr>
<td>6</td>
<td>200</td>
<td>12.5 m (L) x 3.5 m (W) x 3.1m (H)</td>
<td>(5mm+2mm)</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Notes:**
- Extended aeration principle
- Fixed submersible aerators
- Tube Pack media
- Excess sludge to drying beds/sludge holding tanks
- Final reuse/discharge
Bioaugmentation by UWT— a revolution in wastewater treatment!!

- Utilizing specific microorganisms to carry out chemical transformations
- Applied in brewing, pharmaceutical & dairy industries
- Microorganisms constitute the ‘workforce’ in the treatment of municipal & industrial wastewater. They use the soluble organic matter in the waste stream as a food source. The bacteria consume the organic compounds and convert them into CO₂, H₂O and energy to produce new cells.
- CH₄, NH₃ & H₂S are also converted into simpler compounds so that there is no bad odor in the STP area.
- Thus, the soluble pollutants are converted into biomass which are removed mechanically from the waste stream & disposed.

Benefits:
- Enhance BOD removal
- Improved Solids settling
- Preferential degradation of specific compounds
- Improved Nitrification
- Control in E. coli levels
- Odor reduction
- O & G removal

Applications:
- Pond & Lake water
- Hydrocarbon & Oil Spill
- Wastewater, Grease traps & Septic systems

Controlling parameters:
- DO levels
- pH
- Nutrients (N & P)
1. Bar Screening & Primary collection

2. Anaerobic treatment based on Anaerobic Sludge Blanket Process using High Rate Flexible Digester and special microorganisms dosing

3. Total treatment process and operation involve less usage of mechanical equipment, less manpower requirement and ease of operation

4. Treatment followed by filtration
   Removal of BOD, COD, TSS, Bad Odor & E-Coli
Advantages of Anaerobic Treatment

- For the treatment of sewage generated from different sources like toilet, kitchen, canteen, office, etc.
- Use in residential, small scale commercial & hospitality sectors.
- In residential complexes – efficient treatment option for LIG, MIG & to some extent HIG.
- Handles flow up to 500 m³/d.
- Units are constructed underground – so less space requirement.
- Mechanical equipments like blower & sludge handling units not required – hence much less power requirement.
- Max. power requirement – 15 HP
## Some of Our Executed & Ongoing Anaerobic Projects

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Customer</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>West Wind, Ramgarh, Kolkata</td>
<td>300 KLD</td>
</tr>
<tr>
<td>2</td>
<td>Tolly Club, Kolkata</td>
<td>20 KLD (2 Nos.)</td>
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<tr>
<td>3</td>
<td>Bengal Park Chamber Housing Development. ‘Sunrise Greens’, New Town, Kolkata</td>
<td>300 KLD</td>
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<td>4</td>
<td>Bengal Park Chamber Housing Development. ‘Sunrise Junction’, New Town, Kolkata</td>
<td>240 KLD</td>
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<tr>
<td>5</td>
<td>SKDJ Dream House (Parnasree Green), Kolkata</td>
<td>150 KLD</td>
</tr>
<tr>
<td>6</td>
<td>Fortune Township, Barasat</td>
<td>120 KLD</td>
</tr>
<tr>
<td>7</td>
<td>Bengal Shelter Housing Development Ltd., Madhyamgram, Kolkata</td>
<td>150 KLD</td>
</tr>
<tr>
<td>8</td>
<td>RDB Builders, Sonarpur, 24 Parganas (S)</td>
<td>120 KLD</td>
</tr>
<tr>
<td>9</td>
<td>Rotary Club, Piyali, 24 Parganas (S)</td>
<td>50 KLD</td>
</tr>
<tr>
<td>10</td>
<td>Eden Tolly, Kolkata</td>
<td>120 KLD</td>
</tr>
<tr>
<td>11</td>
<td>Sugam Park, Asansol</td>
<td>500 KLD</td>
</tr>
<tr>
<td>12</td>
<td>Merlin Uttara, Kolkata</td>
<td>200 KLD</td>
</tr>
<tr>
<td>13</td>
<td>Kaizen Hotels &amp; Resorts, Durgapur</td>
<td>50 KLD</td>
</tr>
<tr>
<td>14</td>
<td>MPS, Jhargram</td>
<td>15 &amp; 30 KLD</td>
</tr>
<tr>
<td>15</td>
<td>Mark Hotel, Gulshan Group, Sundarban</td>
<td>80 KLD</td>
</tr>
</tbody>
</table>
## Treatment results at some of our sites

<table>
<thead>
<tr>
<th>Client</th>
<th>Dt. of Sampling</th>
<th>Location</th>
<th>pH</th>
<th>TSS</th>
<th>COD</th>
<th>BOD</th>
<th>O &amp; G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parnashree Green</td>
<td>20.03.13</td>
<td>STP Inlet</td>
<td>7.14</td>
<td>58</td>
<td>95</td>
<td>52.5</td>
<td>6.5</td>
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<tr>
<td></td>
<td></td>
<td>STP Outlet</td>
<td>7.05</td>
<td>19</td>
<td>60</td>
<td>11</td>
<td>4.8</td>
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<tr>
<td></td>
<td>25.04.13</td>
<td>STP Inlet</td>
<td>7.54</td>
<td>40</td>
<td>81</td>
<td>52</td>
<td>5.2</td>
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<tr>
<td></td>
<td></td>
<td>STP Outlet</td>
<td>6.85</td>
<td>&lt; 5.0</td>
<td>31.5</td>
<td>4.5</td>
<td>&lt; 1.0</td>
</tr>
<tr>
<td>Fortune Township</td>
<td>10.04.12</td>
<td>STP Inlet</td>
<td>7.58</td>
<td>38</td>
<td>105</td>
<td>62</td>
<td>4.2</td>
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<tr>
<td></td>
<td></td>
<td>STP Outlet</td>
<td>7.19</td>
<td>9</td>
<td>57.7</td>
<td>7.6</td>
<td>&lt; 1.0</td>
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<tr>
<td>Sunflower Garden</td>
<td>27.09.12</td>
<td>STP Inlet</td>
<td>7</td>
<td>140</td>
<td>222</td>
<td>123</td>
<td>8.2</td>
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<tr>
<td></td>
<td></td>
<td>STP Outlet</td>
<td>7.22</td>
<td>88</td>
<td>128</td>
<td>28.4</td>
<td>1.5</td>
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<tr>
<td>Orbit City</td>
<td>05.12.12</td>
<td>STP Inlet</td>
<td>6.94</td>
<td>30</td>
<td>137</td>
<td>91.4</td>
<td>18.4</td>
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<tr>
<td></td>
<td></td>
<td>STP Outlet</td>
<td>7.13</td>
<td>22</td>
<td>78</td>
<td>20.4</td>
<td>5.6</td>
</tr>
</tbody>
</table>
Introduction to Environmental Balance Improvement Device
Entropy

It is the thermodynamic disorder when two systems at different temperatures or concentrations are mixed together. The system then tends to achieve a dynamic equilibrium and is said to be balanced.
Factors & the Occurrence of Imbalance

Generating factor
- Population expansion
- Resources development
- Deforestation
- Site work
- Ocean development
- Urbanization
- Mass production
- Mass consumption
- Deforestation
- Environmental pollution
- Abandonment of chemical substances
- Frequent occurrences of war
- Nuclear power plant disasters
- Infectious diseases

Entropy: low

Internal pressure

Present conditions
- Global warming
- Ozone layer depletion
- Acid rain
- Abnormal weather
- Water contamination
- Natural disasters
- Air pollution
- Exhaustion of resources
- Soil pollution
- Desertification
- CO₂ increase
Unbalance of the substances & Nature

O・H・N・OH・NO・Cl・CH—Radical

Unbalanced environment
Entropy・small

Generation of free radicals
Generation of active oxygen

Killing of microorganisms

Collapse of the food chain
Collapse of the detritus food chain

Resource depletion

Detritus
Carnivore
Flora and fauna
An erosion
Bacteria・Fungi
Active oxygen

Rust・Silica
Chemical Sludge
Corrosion Oxidation
Exhaust Fume

Radical reaction
Anaerobic decomposition
Activated sludge

Incomplete combustion

Sewage Odors

Dpoubnjobufe! particles

Volcano・Earthquake・Sewage・Sludge・Weed・Pest・Disease・Crop failure・algae・Odors・Red tide
Atoms & radicals

Stability
- Entropy • high
- Outermost electrons
- Electron pair
- Radical reaction

Cause of radical generation
- Electromagnetic waves
- Electrical energy
- High temperatures
- Pesticides
- Carcinogens
- Herbicides
- Insecticides
- Radiation
- Industrial waste
- Ultraviolet rays
- Animal Husbandry
- Air pollution
- Acid rain
- Global warming
- Drugs
- Human sewage
- Malnutrition
- Tobacco
- Crude oil pollution
- Food additives

Instability
- Entropy • low
- Radical atoms
- Internal pressure
- Unpaired electron

Radical chain reaction
- Environmental destruction
**Nature & Uses of the Device**

**Transition Metal Powder + Plastic Molding**

**Areas of Application**

- Rivers
- Lakes
- Farms
- Water supply facilities
- Sewerage facilities
- Wells
- Mansions
- High-rise building
- Industrial wastewater
- Hospital wastewater
- Restaurant drainage
- Septic tanks
- Grease traps

- Disappearance of blue-green algae
- Decrease in eutrophication
- Disappearance of sludge
- Improvement of water quality
- Antioxidant
- Water softeners
- Reduction action
- Deterioration prevention
- Wear prevention
- Disappearance of sludge
- Decomposition of inorganics
- Disappearance of the bulking phenomenon
- Water anti-corruption
- Deodorant smells
- Solubilization of garbage
- Decomposition of heavy metals

**Imagery:**
- Rivers
- Lakes
- Groundwater
- Sewage treatment
- Septic tanks
- Sludge
- Eutrophication
- Grease traps
Effects on lakes & ponds

The effect of balance improvement

1) Reduce blue-green algae in lakes
2) Disappearance of odors
3) Disappearance of sludge
4) Improvement of landscape
5) Improvement of living conditions
6) Improvement of water quality from water sources
Eco-Septic Tank
Thank You!!