The Frontier of Water Business

Kolon Water is challenging the competition as we strive to be one of the ten best water companies in the world through superior technology and brand quality.

Kolon Water is preparing for mankind's future and leads the world water business.

Water has become the most precious resource because of the problems associated with global warming, environment pollution, and urban development that has sprung up without consideration for the environment.

For the last half a century, Kolon Water has done business in China, the Middle East, Southern Asia, as well as in South Korea. We have done so, with high-quality environmental technologies and system engineering, and we plan to be a leading company in the environmental business.

Kolon Water also provides a total water solution based on important factors such as planning, construction, operations management, and materials / system engineering. In addition, Kolon Water will strengthen its abilities in the comprehensive environmental business areas including waste management and renewable energies, and we will complete an integrated value chain as well.

As a membrane business of Kolon Water, Kolon Environmental Service Co., Ltd., we offer a total system: the materials and the system for the membrane filtration process. We will be the technological global leader of the water industry through our products and services.
The advantages of partnering with Cleanfil®-S&P for water treatment:

- Cleanfil®-S&P has reinforced hollow fiber membranes that allow for continuous operation in harsh environments.
- Additional options, such as aeration & back-pulse cleaning, can be added to the system for longer membrane life.
- The MF membranes produce high quality effluent at all times.
- The dry type membrane module requires no wetting agent and consequently avoids any laborious operations.
- Each membrane module can be easily assembled, so that its maintenance is very convenient.
- Fully customized, in a compact design, to best meet your needs.

Module & Frame Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Cleanfil®-S20H</th>
<th>Cleanfil®-S30V</th>
<th>Cleanfil®-P76R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Submerged Membrane (Horizontal)</td>
<td>Submerged Membrane (Vertical)</td>
<td>Pressurized Membrane</td>
</tr>
<tr>
<td>Diameter (mm)</td>
<td>1183.6x628x1285 (46.7x24.6x4.1in)</td>
<td>1005x235x644 (39.8x9.2x2.5in)</td>
<td>3216x3220 (38.5x38.7in)</td>
</tr>
<tr>
<td>Effective area</td>
<td>20m² (215SF)</td>
<td>30m² (323SF)</td>
<td>73m² (786SF)</td>
</tr>
<tr>
<td>Casing material</td>
<td>ABS</td>
<td>PVC</td>
<td>PVC</td>
</tr>
<tr>
<td>Flux*</td>
<td>15<del>70LMH (10</del>405SF)</td>
<td>20<del>80LMH (12</del>470SF)</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>2~10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Temperature</td>
<td>40°C (104°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frame</td>
<td>Module number</td>
<td>10~30ea</td>
<td>20ea</td>
</tr>
<tr>
<td>Effective area</td>
<td>200<del>800m² (2150</del>8565SF)</td>
<td>600m² (6568SF)</td>
<td>73m² (786SF)</td>
</tr>
</tbody>
</table>

*Flux can be changed according to source water & operating condition.
Main Features of the K'IMAS Process

- **A compact footprint**
  Smaller space requirements than a conventional process

- **Economic retrofitting with existing conventional processes**
  No extra space required for membranes
  Flexible to upgrade an existing plant infrastructure

- **Process versatility for advanced treatment**
  Pretreatment option in using a high-performance clarifier for solid load reduction to membrane
  Advanced treatment with ozone and GAC for better DOM, taste and odor control

- **Cost-saving maintenance**
  Reduction of air consumption, by the optimization of the aeration, depending on the source water quality

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**K'IMAS Process**

- MF membranes for safe drinking water:
  Removal of particles, colloids, and bacteria to ensure public health and safety

- A cost-effective, low pressure membrane system:
  Increased capacity, small in area size, and low maintenance cost

- Stable water production:
  Reliable and consistent water quality and permeability, even though a change in source water

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**Stable and Effective Water Quality Control**

### High quality water to ensure regulatory compliance

<table>
<thead>
<tr>
<th>Item</th>
<th>Treated Water quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteria</td>
<td>&gt;4 log removal</td>
</tr>
<tr>
<td>Cryptosporidium</td>
<td>&gt;4 log removal</td>
</tr>
<tr>
<td>Giardia</td>
<td>&gt;4 log removal</td>
</tr>
<tr>
<td>Turbidity</td>
<td>&lt;0.1 NTU</td>
</tr>
<tr>
<td>TDS</td>
<td>&lt;1 mg/L</td>
</tr>
<tr>
<td>TOC*</td>
<td>30–70% Removal</td>
</tr>
<tr>
<td>Manganese*</td>
<td>&lt;0.02 mg/L</td>
</tr>
<tr>
<td>Iron*</td>
<td>&lt;0.05 mg/L</td>
</tr>
<tr>
<td>Ca*</td>
<td>&lt;5 PCU</td>
</tr>
</tbody>
</table>

*TOC, manganese, iron and color removal are dependent on raw water quality, and pretreatment can be required
Main Features of the KIMAS-MBR Process

- **Enhancing carbon source usage**
  Effective denitrification by optimizing the carbon source, in the anoxic step, prior to the anaerobic reactor

- **Optimizing DO control for denitrification**
  Efficient reduction of excess DO, recycled from the MBR in the stabilization step

- **Separated MBR from the oxic tank**
  Energy saving, by reducing air consumption
  High aeration efficiency using fine bubbles for the oxic tank and coarse bubbles for the MBR

- **Ease of maintenance**
  Unmanned process control by fully automated operation

Stable and Effective Water Quality Control

<table>
<thead>
<tr>
<th>Item</th>
<th>Source Water</th>
<th>Treated Water</th>
<th>Removal Efficiency(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD (mg/L)</td>
<td>150.4 (192–224)</td>
<td>0.7 (0.2–1.8)</td>
<td>99.5 (98.7–99.9)</td>
</tr>
<tr>
<td>CODa (mg/L)</td>
<td>68.6 (54.1–99.8)</td>
<td>6.5 (4.1–17.9)</td>
<td>90.3 (87.1–93.5)</td>
</tr>
<tr>
<td>CODb (mg/L)</td>
<td>243 (198–329)</td>
<td>16.7 (11.1–23.6)</td>
<td>93.0 (88.5–96.6)</td>
</tr>
<tr>
<td>SS (mg/L)</td>
<td>52.7 (34.4–118)</td>
<td>0.05 (0.04–0.05)</td>
<td>99.9 (98.9–100)</td>
</tr>
<tr>
<td>T-N (mg/L)</td>
<td>49.8 (35.5–57.6)</td>
<td>7.3 (4.1–9.1)</td>
<td>83.9 (81.1–85.9)</td>
</tr>
<tr>
<td>T-P (mg/L)</td>
<td>6.3 (4.6–7.7)</td>
<td>3.15 (2.2–5.9)</td>
<td>58.4 (24.5–42.2)</td>
</tr>
<tr>
<td>Alum Injection</td>
<td>0.57 (0.18–1.25)</td>
<td>91.2 (82.6–98.1)</td>
<td></td>
</tr>
<tr>
<td>Coliform (MPN / 100mL)</td>
<td>5.52×10^5</td>
<td>0.5 (2.0–5.0)</td>
<td>99.99 (99.8–100)</td>
</tr>
</tbody>
</table>
Results of Business

**DWT**
- **Demo-scale Drinking Water Treatment Plant**
  - **Client**: Seoul
  - **Capacity**: 25,000 m³/day

- **Drinking Water Treatment Plant in Nongju, China**
  - **Client**: Nongju Spring Co., Ltd.
  - **Capacity**: 6,700 m³/day

- **Drinking Water Treatment Plant in New Zealand**
  - **Client**: Dunedin, New Zealand
  - **Capacity**: 3,000 m³/day

**MBR**
- **Jeongyeong Industrial Complex Wastewater Treatment Plant**
  - **Client**: Jeongyeong-gun, Chungbuk-do
  - **Capacity**: 2,000 m³/day

- **Kolon Industries, Inc. Gumi Plant Wastewater Treatment Plant**
  - **Client**: Kolon Industries Co., Ltd.
  - **Capacity**: 10,000 m³/day

- **Masan City Jindong Sewage Treatment Plant**
  - **Client**: Changseong City, Gyeongnam, South Korea
  - **Capacity**: 4,000 m³/day

- **Geonmad Industrial Estate Wastewater Treatment Plant in Incheon**
  - **Client**: Incheon Metropolitan City, Korea Environment Corporation
  - **Capacity**: 9,000 m³/day

- **Hynix Wastewater Treatment Plant in China**
  - **Client**: Hynix Semiconductor Ltd., China
  - **Capacity**: 2,000 m³/day

- **Deokjeongeong Resting Place Sewage Treatment Plant**
  - **Client**: Deokjeongeong Land Co., Ltd.
  - **Capacity**: 1,100 m³/day

**Others**
- **Gongsan Gangbuk (Sewage, 4,500 m³/day)**
- **Danggung Gongsan (Drinking Water Treatment, 40,000 m³/day)**
- **Uiryeong Woodace (Drinking Water Treatment, 6,500 m³/day)**
- **West Tairol, New Zealand (Drinking Water Treatment, 5,400 m³/day)**
- **Guri City J System (Sewage, 6,200 m³/day)**
- **Chungju Neapolis (Wastewater, 5,500 m³/day)**

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