SAY GOODBYE to Biological Wastewater Treatment
SAY HELLO to Spent-Water Processing

STOP wasting space, time, and money treating wastewater biologically. Why build a big costly wastewater treatment plant that throws away valuable resources? Recover and reuse those resources by installing a small simple spent-water filtration system.

With the CORNCOB technologies, you can create a zero-discharge process and tap into your spent-water resources with only 70% the capital cost, 50% the operational cost, and 20% of the footprint necessary for conventional MBR systems.

“spent-water (spent ’water)
the consideration of water used in processes, industrial or otherwise, not as waste, but as a resource.”
The CORNCOB II Dynamic-Membrane™ filtration system, with its proprietary high-velocity cross flow (HVCF) disc configuration, is the perfect membrane filtration system!

Current membrane processes rely on high-energy pumping to recirculate fluid through a series of static membranes to achieve high cross-flow velocity.

The CORNCOB II system's pressure enclosure houses an innovative Dynamic-Membrane™ cartridge. During operation, the double-sided membrane discs rotate in the fluid. The rapid rotational action creates high surface relative velocity, between the fluid and membrane surface, resulting in maximum cross-flow velocity.

The benefits of moving the membranes, not the fluid, are numerous including higher long-term flux, significant cost savings, alongside a 50% plus reduction in energy requirements.
A simple one-step process design delivers positive results for concerns including sufficing regulatory requirements, increasing project ROI and promoting global sustainability.

CORNCOB II's innovative membrane technology permits solids to be taken in with minimal need for pretreatment and delivers high undiluted concentrate yields. Also, suspended and dissolved solids are separated down to their smallest molecular degree. The self-cleaning membranes demand notably less energy and need no backwash or process chemicals.

The pressurized system is completely enclosed and requires a small footprint area. A fully automated 'plug-n-play' modularized system.

### 1-STEP PROCESS

<table>
<thead>
<tr>
<th>ENERGY</th>
<th>• OVER 50% ENERGY REDUCTION</th>
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</thead>
<tbody>
<tr>
<td>WATER</td>
<td>• REUSABLE WATER</td>
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<tr>
<td></td>
<td>• ZERO DISCHARGE</td>
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<tr>
<td>TREATMENT</td>
<td>• MINIMUM TO NO</td>
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<tr>
<td></td>
<td>• PRE-TREATMENT OR</td>
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<td></td>
<td>• CHEMICALS NEEDED</td>
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<tr>
<td>BACKWASH</td>
<td>• NO BACKWASH</td>
</tr>
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<td></td>
<td>• NO DOWNTIME</td>
</tr>
<tr>
<td>SOLIDS</td>
<td>• LARGER FEED SOLIDS</td>
</tr>
<tr>
<td></td>
<td>• HIGHER CONCENTRATIONS</td>
</tr>
<tr>
<td></td>
<td>• SAME SOLIDS PROPERTIES</td>
</tr>
<tr>
<td>SYSTEM</td>
<td>• SMALL FOOTPRINT</td>
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<td></td>
<td>• FULLY ENCLOSED</td>
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<td></td>
<td>• FULLY AUTOMATED</td>
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<tr>
<td>COSTS</td>
<td>• ROI</td>
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<tr>
<td></td>
<td>• REDUCED CAPITAL AND</td>
</tr>
<tr>
<td></td>
<td>• OPERATING COSTS</td>
</tr>
</tbody>
</table>

Committed to global water sustainability

www.corncobinc.com | 1-262-513-8890
On-Site Testing —

THE RESULTS ARE CLEAR

**Brewery**

**CHALLENGES**
Company plans to expand its manufacturing division and often faces fines/surcharges due to their wastewater discharge.

**OBJECTIVES**
Reduce volume of water needed for operations; meet regulations for reuse of non-potable water; reduce TDS, TSS, BOD

**RESULTS**
Met regulation levels for re-use of non-potable water, significantly reduced BOD, TDS, TSS, and reduced discharge volume.

**County Landfill**

**CHALLENGES**
The landfill plans to treat its own leachate to reduce the hauling to nearby wastewater treatment plants.

**OBJECTIVES**
Separate water from heavy metals and other 140 chemicals and reduce retained concentrate for minimal hauling.

**RESULTS**
Produced permeate suitable for discharge/reuse and reduced concentrate for minimal hauling.

**Industrial Laundry**

**CHALLENGES**
Company is initiating water-reuse and various recycling programs into daily operation to reduce water intake and treatment with the existing DAF.

**OBJECTIVES**
Reduce volatile contaminants of concern that negatively affect ability of the washing systems.

**RESULTS**
The UF permeate is suitable for reuse towards non-white garments. The RO permeate is suitable for reuse towards white garments.

**Municipal Wastewater**

**CHALLENGES**
Municipality plans to begin treating its own wastewater to alleviate the load and payment to a neighboring township.

**OBJECTIVES**
Meet government EPA compliance regulations to discharge effluent to a nearby river.

**RESULTS**
Reduced parameters of concern by 94-100% and produced permeate suitable for discharge/reuse.
The standard Dynamic-Membrane shaft assembly includes multiple discs mounted on a rotating shaft. One or more shaft assemblies are then mounted on a removal structural cartridge, which is contained in a pressure housing. The disc cartridge and pressure housing make up the complete membrane module.

Each disc consists of a circular plate with membranes and underlying permeatesheets applied to both sides. Membranes are selected from the full range of pore sizes covering Micro, Ultra, Nano Filtration to RO (Reverse Osmosis). Discs vary in size from 1’ to 3’ in diameter.

Robust shafts create optimal rotational speed which results in effective high-velocity cross flow. This affects efficient, continuous membrane surface cleaning resulting in higher flux and solids concentration.

Unique spacing between the discs allows larger solids and higher concentrations without plugging.

Over the next 20 years water consumption for generating energy will need to increase by 85%.1

1 https://www.weforum.org/agenda/2015/01/why-world-water-crises-are-a-top-global-risk/
Slide-n-Place Membrane Cartridge.

The state-of-the-art proprietary membrane cartridge supports the Dynamic-Membrane assemblies including discs, membranes, shafts, hubs, gaskets, bearings, and seals. A durable track frame encircles the entire membrane cartridge allowing the cartridge to slide in-and-out of the housing quickly and smoothly.

ULTIMATE TIME AND COST SAVER

Current day systems demand costly system downtime to replace a single or multiple membranes. Additionally, if system inefficiencies occur, the daisy chain type configuration can result in significant troubleshooting time in tracking down the defective membranes.

Distinctively designed to permit easy replacement, the membrane cartridge is designed to be easily replaced. In virtually less than an hour a new membrane cartridge can be swapped out and the entire system is back up and running.

The used cartridges are recycled and refurbished, saving both money and the environment.

Broad Applications

Dynamic-Membrane’s ability to accommodate a broad range of feed types without plugging generates an open-door for endless applications:

- Water Reuse / Reclamation
- Complete Spentwater Processing
- Potable Water Supply
- Solids / Ingredients Concentrating
- Liquid Purification

MUNICIPAL • INDUSTRIAL • COMMERCIAL • RESIDENTIAL
The CORNCOB II pressure housing is a fully enclosed unit that houses the Dynamic-Membrane cartridge and facilitates high transmembrane pressure, resulting in increased filtration rates. Pressure is dependent on the vessel size, which can range from 10-600psi.

The housing is manufactured to withstand a wide range of environments, including highly corrosive fluids. It can be made from 304, 316 Stainless Steel or coated Carbon Steel materials.

BELT DRIVEN SHAFTS —
Reinforced rubber belts drive the membrane shafts. The motor/belt alliance generates the rotational speed of the membranes and the high-velocity cross flow.

The belt drive is powered through a VFD to automatically control disc rotation.

WATER DEMAND WILL OUTSTRIP SUPPLY BY 40% BY 2030. ²

THE PRESSURE HOUSING

Major Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MULTIPLE INLET FEED NOZZLES</td>
<td>Operator has control over flow patterns.</td>
</tr>
<tr>
<td>PRESSURE TRANSMITTER</td>
<td>Digital pressure sensor aids in system automation, reduces operator oversight and guards against over-pressurization.</td>
</tr>
<tr>
<td>PRESSURE RELIEF VALVE</td>
<td>When pressure exceeds set maximum level fluid is automatically released out of the housing, guarding against potential damage.</td>
</tr>
<tr>
<td>‘CIP’ SIGHT GLASS</td>
<td>External viewing mechanism allows system operator to visually monitor water levels during ‘CIP’.</td>
</tr>
<tr>
<td>SWING DOOR CLOSURE</td>
<td>Easy release, multi-locking mechanisms seal the housing and enable quick access to membrane cartridge.</td>
</tr>
<tr>
<td>VIEWING PORTS (Optional)</td>
<td>In clean liquid applications, system operator can visually inspect membranes while observing the overall process in operation, allowing for adjustments to both feed and concentrates.</td>
</tr>
</tbody>
</table>

Feasibility | Pilot Testing

‘Alfie’, the CORNCOB mobile pilot unit is on the move conducting field pilot / feasibility tests. ‘Alfie’ is a flexible pilot unit capable of various tests inside its 20-foot open door freight container. Our expert test team works on-site collecting and analyzing for the particular application in terms of treatment objectives.
THE SERVICE MODULE

Service module skids can be easily enlarged to support the process for larger applications that require multiple membrane modules.

Built-in HMI (human machine interface) gives simple, hands on control to the entire process from either touch screen or wireless tablet, resulting in consistent process control and enhanced monitoring.

The skid mounted, compact process service module includes all required components for the operation. It includes a feed pump, inlet / outlet piping, isolation valves, flowmeters, flow control valve, VFDs (variable frequency drives) and a control panel.

A reliable PLC/HMI interface system provides the operator a user friendly and intuitive method for full system control from the control panel or wireless tablet. The simple user interface uses touch screen control over the entire system and allows the operator to make adjustments and immediately observe the results.

CONTROL PANEL FEATURES
- HMI (Human Machine Interface)
- Flowmeters
- Pressure Sensor
- Alarm
- H-O-A
- Clog Indicator
- Emergency Stop Button
- Reset Button
- 4 Additional Power Receptacles

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Major Components

PLUG & PLAY — The service module comprises a complete, fully automated ‘Plug & Play’ system. All feed, discharge, electrical connections are brought to a convenient location in the service module for easy commissioning.

Automated ‘CIP’ Technology

CROSS FLOW DETECTION | PRE-CIP — When flux rates decrease, the system increases the disc rotational speed and can change direction, assuring maximum surface cleaning.

CIP is activated only when self-cleaning sequences detect the need, as opposed to using a timer, thus saving chemicals and reducing downtime.

An external viewing sight glass allows operator to visually monitor water levels during ‘CIP’ cleaning.
### Models and Specifications (US/Imperial)

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>DIMENSIONS L x W x H (in)</th>
<th>WEIGHT (kg)</th>
<th>SURFACE AREA (ft²)</th>
<th>NUMBER OF DISCS</th>
<th>CAPACITY (GPD)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCII-3Q / 12000 x 1200</td>
<td>420 x 85 x 109</td>
<td>23,243</td>
<td>12,360</td>
<td>3’ x 1200</td>
<td>247,200</td>
</tr>
<tr>
<td>CCII-3Q / 8000 x 800</td>
<td>332 x 85 x 109</td>
<td>17,400</td>
<td>8,240</td>
<td>3’ x 800</td>
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<tr>
<td>CCII-3Q / 6000 x 600</td>
<td>332 x 85 x 109</td>
<td>16,600</td>
<td>6,180</td>
<td>3’ x 600</td>
<td>123,600</td>
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<tr>
<td>CCII-2Q / 3840 x 840</td>
<td>287 x 68 x 91</td>
<td>11,350</td>
<td>3,840</td>
<td>2’ x 840</td>
<td>76,800</td>
</tr>
<tr>
<td>CCII-2Q / 2560 x 560</td>
<td>227 x 68 x 91</td>
<td>8,550</td>
<td>2,560</td>
<td>2’ x 560</td>
<td>51,200</td>
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<tr>
<td>CCII-2Q / 1280 x 280</td>
<td>167 x 68 x 91</td>
<td>5,750</td>
<td>1,280</td>
<td>2’ x 280</td>
<td>25,600</td>
</tr>
<tr>
<td>CCII-1Q / 540 x 540</td>
<td>193 x 48 x 71</td>
<td>2,785</td>
<td>558</td>
<td>1’ x 540</td>
<td>11,160</td>
</tr>
<tr>
<td>CCII-1Q / 360 x 360</td>
<td>143 x 48 x 71</td>
<td>2,045</td>
<td>372</td>
<td>1’ x 360</td>
<td>7,440</td>
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<tr>
<td>CCII-1Q / 180 x 180</td>
<td>117 x 48 x 71</td>
<td>1,375</td>
<td>186</td>
<td>1’ x 180</td>
<td>3,720</td>
</tr>
</tbody>
</table>

*1 GPD = 0.0038 CMD  **GFD = 1.7 LMH

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**Application Flexibility**

CCII membrane modules are available in a wide variation of sizes and configurations. Modules can be multiple to create a customized filtration system to fit specific applications.

The wide range of models creates a cost-effective solution for new-builds, expansions or standby units.

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* https://www.weforum.org/agenda/2015/01/why-world-water-crises-are-a-top-global-risk/*