With Innovative Membrane BioReactor Retrofit Technology

Retrofit Benefits with TITAN MBR MEM-BOX™

- Incorporate Best-Available Technology for your existing treatment plant
- Double plant capacity with minimal changes to the existing infrastructure
- Improve effluent quality dramatically, providing potential for water reuse
- Achieve complete nitrification
- More cost-effective compared to design and construction of a new plant
- Smith & Loveless offers significant process and retrofit experience

TITAN MBR MEM-BOX™ System Features

- Engineered and pre-assembled in S&L's quality-controlled factory
- Compact design allows insertion into any aeration basin, concrete or steel
- Exclusive, S&L V-Crimp tankage coated with VERSAPOX® epoxy coating
- Contains robust, flat-plate TITAN MBR™ Membranes
- Maintains high permeability and consistent flux
- Clean in place without plant interruption
TITAN MBR™ Membrane Advantages vs. Alternative Designs

Durable Membrane & Module Composition
- Composed of PVDF [polyvinylidene fluoride] and PET non-woven fabric
- Membrane Sheets never collide during operation
- Robust design prevents breakage experienced in alternatives
- Produces higher flux rates over the life of the membrane
- Gravity feed into system eliminates need for pumps

Flat-Plate Design Superior Alternative to Hollow Fiber
- Eliminates clogs experienced in hollow fiber membranes
- Smooth, continuous surface negates bundling by stringy solids
- Facilitates air scouring much more effectively

More Economical Cleaning Method: Clean in Place (CIP)
- CIP reduces operating costs
- Requires less chemicals and operator time
- No backpulsing is required; eliminates associated equipment

TITAN MEM-BOX™ Sizing Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Custom Design Flow gpd (cmd)</th>
<th>Total Plant Volume gallons (cm)</th>
<th>Flow with TITAN MBR MEM-BOX™ gpd (cmd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25,000 (95)</td>
<td>50,000 (190)</td>
<td>62,000 (230)</td>
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<tr>
<td>1.5</td>
<td>32,000 (120)</td>
<td>59,000 (220)</td>
<td>80,000 (300)</td>
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<tr>
<td>2</td>
<td>50,000 (190)</td>
<td>94,000 (350)</td>
<td>125,000 (470)</td>
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<tr>
<td>3</td>
<td>76,000 (285)</td>
<td>145,000 (545)</td>
<td>190,000 (715)</td>
</tr>
</tbody>
</table>

TITAN MBR MEM-BOX™ Components
The complete system provided by Smith & Loveless includes:
- TITAN MBR MEM-BOX™ with S&L V-Crimp design
- TITAN MBR™ Membrane Module(s)
- PLC controls
- All required valves and piping
- Recycle pump
- Chemical storage tank
- Air supply for scouring
- Technical support during design and start-up phases