

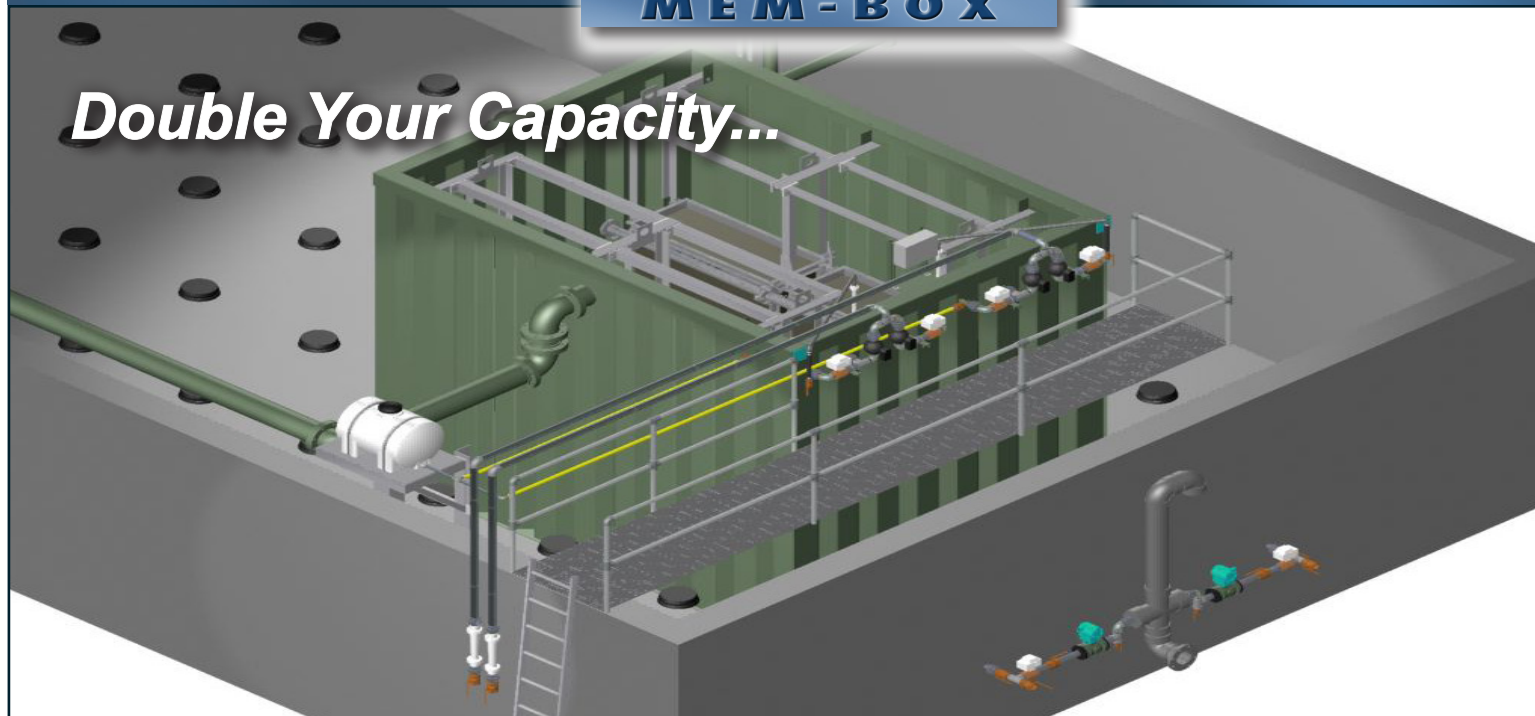


Smith & Loveless Inc.



**MBR Retrofit
System**

Double Your Capacity...



With Innovative Membrane BioReactor Retrofit Technology

Retrofit Benefits with TITAN MEM-BOX™

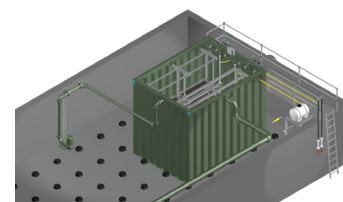
- Incorporate Best-Available Technology for your existing treatment plant
- Double plant capacity with minimal changes to the existing infrastructure
- Improve effluent quality dramatically, providing potential for water reuse
- Achieve complete nitrification
- More cost-effective compared to design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

TITAN MEM-BOX™ System Features

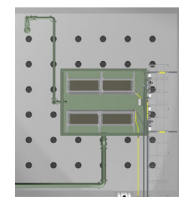
- Engineered and pre-assembled in S&L's quality-controlled factory
- Compact design allows insertion into any aeration basin, concrete or steel
- Exclusive, S&L V-Crimp tankage coated with **VERSAPOX®** epoxy coating
- Contains robust, flate-plate **TITAN MBR™** Membranes
- Maintains high permeability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

***TITAN MEM-BOX™ is
designed to insert into an
existing aeration basin.***

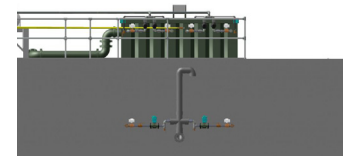
Isometric View



Plan View



Elevation View



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Smith & Loveless Inc. • Innovative Solutions for the World's Water

TITAN MEM-BOX™ 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 system eliminates need for pumps

Flat-Plate Design Superior Alternative to Hollow Fiber

- Eliminates fouling experienced in hollow fiber membranes
- Smooth, continuous surface negates bundling by stringy solids
- Air scouring much more effective

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 MBR™ Membrane Data (typical)

Design Flux	13 gpd/sf
Pore Sizing	0.08 microns
Transmembrane Pressure	0.50 - 2.00 psi
Cleaning (In-tank)	Semi-annual



TITAN MEM-BOX™ Sizing Data

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

TITAN MEM-BOX™ Components

The complete system provided by Smith & Loveless includes:

- TITAN 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



TITAN MEM-BOX™ is the ideal MBR retrofit for package plants as well as concrete basins. Its compact design facilitates insertion into the existing plant with minimal changes to the existing plant structure.