



Smith & Loveless Inc.

TITANTM
MBR



Delivering the Best Experience... Packaged for You.

The MBR Packaged for You...



From the Innovator in operator-friendly packaged treatment systems, S&L delivers to you the best available MBR technology for Operation and Maintenance and Total Cost of Ownership.

Performance with Smart Automation

- Achieve efficient treatment for high quality effluent and reuse
- Automation features include decanting and chemical cleaning
- Color touchscreen PLC controls offer intuitive monitoring & control

Easiest Operation & Maintenance of all MBRs

- Infrequent & simplest membrane cleaning of any MBR
- Easily accessible PLC, electrical & process components
- No internal mechanical pumps eliminate O&M tasks & costs

Robust System Design

- Quality-controlled manufacturing with stainless steel components
- Flat-sheet membrane construction for less breakage & longer life
- Pre-wired, compact models ideal for shipping & site requirements

Creating Value for You

- Superior total cost of ownership with simplified O&M
- Best Available Technology: achieves water reuse quality effluent
- Single-source support comes from company with 70+ years

System Overview



California Title 22 Compliant



Achieve Superior Effluent Quality

BOD:	< 3 mg/l
TSS:	< 1 mg/l
Turbidity:	< 0.2 NTU
TN:	< 3 mg/l*
NH ₃ :	< 1 mg/l
TP:	< 0.05 mg/l*

* achievable with optional process selections

S&L Flat-Plate Membrane Data [Typical]

Type:	Submerged, PVDF+PET Flat-Plate
Design Flux:	13 gpd/sf [22.1 l/mh]
Pore Sizing:	0.08 microns [MF]
TMP Range:	[Trans Membrane Pressure] 0.50 - 2.00 psi [35 - 138 mB]
Cleaning:	In-Place; Semi-annual cycle**; 4 hrs. ** depending upon the influent

Flow: 5,000 gpd - 0.1 MGD / 19 cmd - 378 cmd

Standard Systems

Each American factory-built **TITAN MBR™** System includes robust, epoxy and polyurethane coated S&L V-Crimp tankage, configured process and MBR zones with S&L flat-plate Membranes, automatic fine screening (if selected), stainless steel internal components, pre-wired instrumentation, and **QUICKSMART™** Touchscreen PLC Controls. The result provides best-available MBR technology with superior O&M ease.

Featured Options

- Enhanced Remote Monitoring
- Process Instrumentation
- Zones for Enhanced Nutrient Removal
- Tank Covers / Weatherization Packages
- Skid-mounted Chemical Cleaning Tank
- Covers for Instrumentation
- Aluminum or 316 Stainless Steel Cable Trays

System Diagram & Features

Designed with robust stainless steel piping, smart automation and O&M cost-saving features, **TITAN MBR™** delivers the best in MBR experience.



Other Standard Features & Options

- Stainless Steel Piping Throughout
- S&L V-Crimp Epoxy-Coated Tankage
- Optional Noise Attenuation [Blowers]
- Optional Tank Covers
- Optional Remote Monitoring Services

System Process & Construction Features

1 Flexible Process Zones, Configured

TITAN MBR™ comes configured to meet your effluent goals. Optional Flow Equalization, Anoxic & Sludge Storage Zones complement the MBR Zone. California Title 22 compliant, achieving water reuse.

2 Automatic Anoxic Recycle System

Adjustable recycle stainless steel **LIQUIDLIFT™** accommodates lower flow conditions to maintain high levels of nitrification. Automatically controlled by the PLC with HMI operator input.

3 Robust, Efficient Aeration

Stainless steel, medium-bubble aeration lowers operating costs while eliminating the fouling and maintenance costs associated with fine bubble type diffusers.

4 Smart Wire Management System

Factory-installed and strategically located instrumentation and cable wireways minimize field wiring for easier installation. Optional instrumentation covers [shown above] are available.

5 Simple, Automatic Fine Screening

Any **TITAN MBR™** model with Flow Equalization comes standard with integral **OBEX™** fine screening.

Operation & Maintenance Features

6 Safe & Easy O&M Access [Factory-Supplied]

S&L stairway access to walkway for easy O&M. All maintenance tasks can be safely and comfortably accomplished from here—protected by OSHA standard 42" high [106 cm] safety railing.

7 Easy, Infrequent Membrane Cleaning

Membrane clean-in-place [CIP] system, typically conducted semi-annually for less than 4 hours, features easy to access tankage for feed and spent chemicals.

8 Influent Transfer Eliminates Pump O&M

S&L **MINI-JECT™** influent transfer with no moving parts eliminates need for mechanical pumps and associated maintenance & replacement costs. Provides constant flow regardless of flow level.

9 QUICKSMART™ PLC Touchscreen Ease

QUICKSMART™ System Controls provide unparalleled ability to monitor and adjust all of your treatment system functions with a highly intuitive, easy-to-navigate touchscreen PLC interface.

10 RemoteView™ Cloud Remote Monitoring

Cloud-based **RemoteView™** monitoring services are available from Smith & Loveless Inc. We are here to help you!

S&L Flat-Plate Membrane Features

11 Robust Submerged S&L Flat-Plate Membranes [MBR Zone]

TITAN MBR™ Flat-Plate Membranes (MF) maintain high permeability and flux rates even at peak-day rates. They stack within a fully submerged module inside the aeration zone. Transmembrane pressure created by gravity drives the flow through the membranes. Clean water discharges while blocked solids remain in the aeration zone. Diffusers beneath the module scour the membranes while also providing air supply to the bacteria. Chemical cleaning occurs efficiently in-place—typically on a semi-annual basis—with simple chemical injection. No permeate pumps are required, saving energy and maintenance compared to most other MBR systems.

Compare Submerged S&L Flat-Plate Membranes vs. Hollow-Fiber & Other Types

- Lower fouling rate because of better air scour with the flat sheet
- Cleaned in place; no need to remove membranes
- Less chemicals needed to clean
- Less time to clean
- No breakage issues; more durable
- No issues with stringy solids like hair
- No backwash or back pulse required
- No air integrity testing or pinning of fibers

Achieves Title 22 Water Reuse

Type:	Submerged, PVDF+PET Flat-Plate
Design Flux:	13 gpd/sf [22.1 l/mh]
Pore Sizing:	0.08 microns [MF]
Trans Membrane Pressure:	0.50 - 2.00 psi [35 - 138 mB]
Cleaning:	In-Place; Semi-annual cycle; 4 hrs.

Intuitive PLC Controls

featuring



 Superior Graphics

 Easy-to-Navigate

 Remote Automation

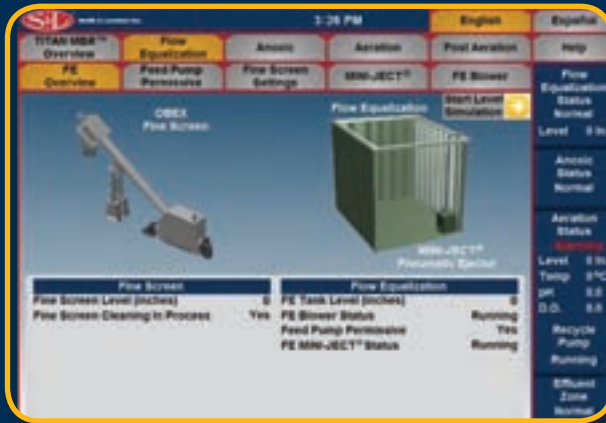


Delivering simplified operation yet powerful TITAN MBR™ control, **QUICKSMART™** System Controls provide unparalleled ability to monitor and adjust all of your treatment system functions, including:

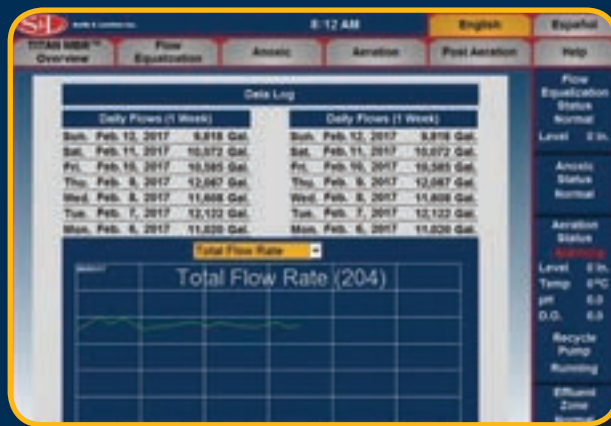
- **Troubleshooting** support comes standard with new I/O Status screen that displays controller digital and analog I/O status.
- **Maintenance Log** - Displays recommended O&M instructions and makes suggestions based on actual system operation.
- **Automated Decanting** - Automatic sludge storage decanting airlift with timer controlled by QUICKSMART™ PLC with HMI operator adjustment. Air to sludge storage zone is shut down automatically before decanting airlift runs.
- **RAS Automation** - Adjusts the recycle LIQUIDLIFT™ [when anoxic zones are present] to accommodate lower flow conditions to maintain high levels of nitrification.
- **Dual-language toggle** provides control screens fully in Spanish and English with a simple toggle button.

Sample Screenshots

[Entire screen not displayed here]



System Overview



Data Log

PLC IN				PLC OUT			
000	0	000	0	0000	0	0000	0
001	0	001	0	0001	0	0001	0
002	0	002	0	0002	0	0002	0
003	0	003	0	0003	0	0003	0
004	0	004	0	0004	0	0004	0
005	0	005	0	0005	0	0005	0
006	0	006	0	0006	0	0006	0
007	0	007	0	0007	0	0007	0

I/O Status



Main Features

- 9.7" (24.6 cm) 65K-Color TFT LCD Touch Screen HMI
- PLC/Microprocessor-Based Controller
- NEMA 4 Rated when Installed in Enclosure
- UL Certified
- Protected by Surge Protective Device (SPD)
- English/Spanish Toggle
- More than 15 Different Screen Selections
- Data, Maintenance, and Alarm Logging
- Complete "Help" Menu and Support Screens



RemoteView™ Cloud Services through QUICKSMART™

Gain remote access monitoring and troubleshooting services with RemoteView™ from S&L. We are here to help you make owning and operating an MBR the easiest of any system.



Delivering the Best Experience...Packaged for You

Performance

TITAN MBR™ provides high oxygen transfer and a stable process tailored to your requirements, and is capable of achieving superior effluent quality and Title 22 approved water reuse.

Easiest MBR O&M

Experience the best O&M of any MBR through quick component access, smart instrumentation, remote data monitoring, reduced process complexity, & streamlined [CIP] membrane cleaning.

Robust Design

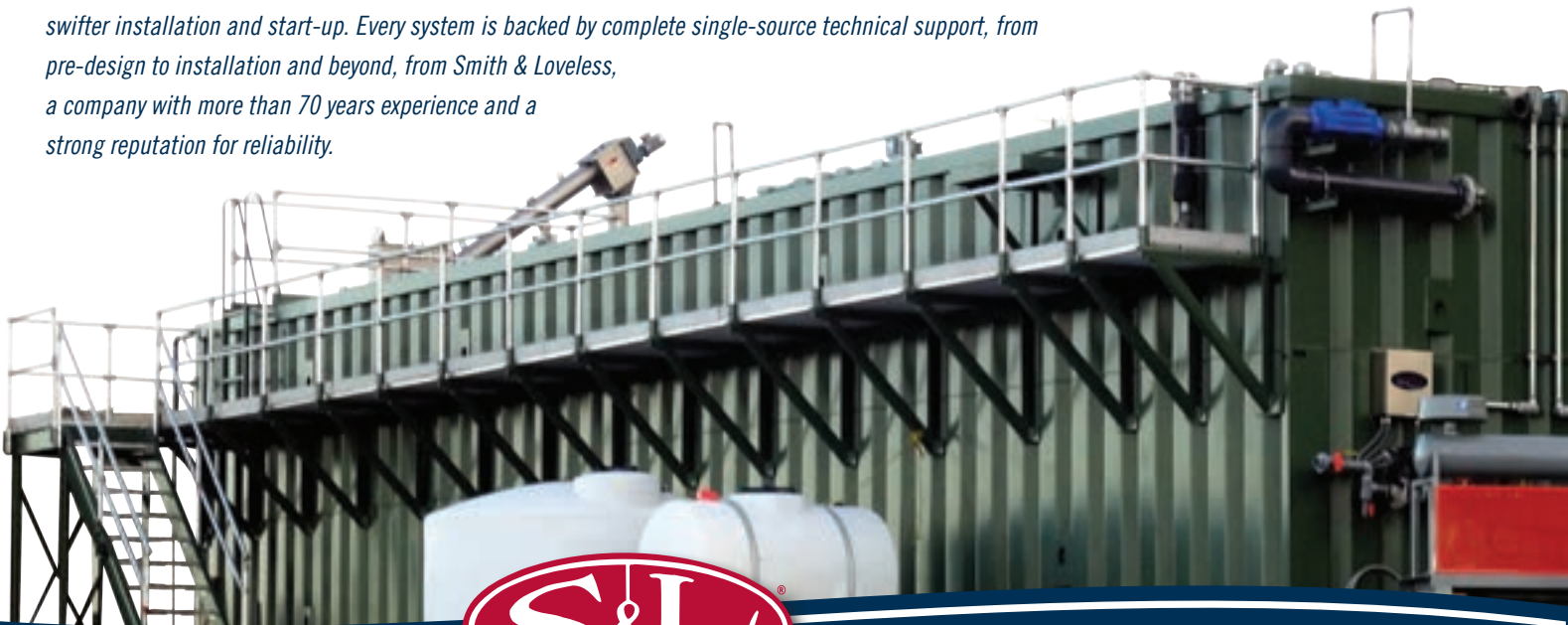
Rugged tank and flat-sheet membrane construction with expanded stainless-steel componentry and streamlined electrical design. Intuitive graphical touchscreen QUICKSMART™ PLC provides easy control.

Value

Increased energy efficiency [up to 30%] with updated process & automation & no permeate pumps. Backed by complete single-source technical support, from pre-design to installation and beyond.



TITAN MBR™ arrives in compact factory-built system models now with significantly less field assembly for swifter installation and start-up. Every system is backed by complete single-source technical support, from pre-design to installation and beyond, from Smith & Loveless, a company with more than 70 years experience and a strong reputation for reliability.



Smith & Loveless Inc.
www.SmithandLoveless.com

Phone: (913) 898-5201
Fax: (913) 888-2173

14040 Santa Fe Trail Dr.,
Lenexa, KS USA 66215-1284