

Modular FAST[®]

Pre-engineered Biological Wastewater Treatment System



Low Maintenance & Operation
Wastewater Treatment
for the 21st Century

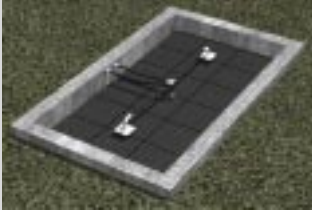


Smith & Loveless, Inc.

See No Evil, Hear No Evil, Smell No Evil

Unique.
Proven.
Reliable.

Modular FAST



Top view of system (tank lid removed)

Media Savvy

FAST media provides high surface-to-volume ratio to maintain good bacterial growth during both low and peak usage. Bacteria become "fixed" or attached to the fully submerged, stationary media, therefore a sufficient population is consistently preserved in the aeration tank to metabolize the waste. Continual bacterial growth ensures a high level of treated effluent. For BOD removal, the system can function adequately with two weeks of no flow.

Low Operation and Maintenance

The Modular FAST system contains no pumps or filters to clean or replace. It contains only one moving part: the air blower, which is placed above or below the ground in a convenient and remote location. Because the plant is self-regulating, no daily operation & maintenance is necessary.

Modular FAST provides end-users a proven solution to potentially unsightly, noisy and odorous problems associated with some wastewater treatment systems. Using the patented FAST process (an acronym for *Fixed Activated Sludge Treatment*), Modular FAST is a fixed-film, aerated system utilizing the principles of attached and suspended growth with the ability to nitrify/denitrify.

Able to be installed below or above grade, Modular FAST offers high-quality treated wastewater and preserves the aesthetics of the surrounding environment. The attached growth facilitated by the FAST media ensures a high level of continuous treatment even with wide variations in flows. The result is clean and odorless effluent.



At this scenic botanical gardens, you can't see it — or smell it — but a Modular FAST wastewater treatment system that discharges to a constructed wetlands operates underground, meeting the demands of 3 million annual visitors.

Modular FAST Advantages

Flexible Application

Designed for replacing existing septic or new on-site systems in municipal, private development and industrial process wastewater applications for superior BOD/TSS removal and nitrification/denitrification.

High Level of Bacterial Concentration

"Fixed Activated Sludge Treatment" maintains a high level of bacteria in the aeration zone, which provides stable operation, breaks down biodegradable constituents in the wastewater, and prevents bulking conditions and settling problems. Smaller required tank sizes for the same application is a cost-benefit passed onto the user.

Long Sludge Age

With high bacterial concentration, Modular FAST boasts a significantly longer sludge age than conventional plants. A long sludge age achieves nitrification and denitrification much easier, operates more effectively in cold climates, and less sludge is produced.

High Quality Effluent

High quality effluent from Modular FAST extends leach field life (because of the low solids carry-over) and can minimize the leach field land area required. Its clear effluent also makes the system ideal for pretreatment to aeration ponds, lagoons and constructed wetlands. No clarifier is required for subsurface discharge applications.

High Resistance to Hydraulic and Organic Shock Loads

Because the bacteria are attached to the FAST media in the aeration zone, the system prevents washout of bacteria, enabling Modular FAST to endure peak or spike flow conditions.

Low Energy Requirements

Modular FAST systems contain only one moving part that requires electricity: the air blower.

Effluent Data from Modular FAST

| Actual Data <small>Figures Rounded Off</small> | BOD | | TSS | | Removal % | | Nitrogen (% Removal) OUT |
|---|------|-----|------|-----|-----------|-----|--------------------------------|
| | IN | OUT | IN | OUT | BOD | TSS | |
| High School <small>12,000 GPD</small> | 186 | 3 | 74 | 12 | 98 | 84 | 0.5 NH ₃ -N |
| Conv. Shop <small>2,000 GPD</small> | 716 | 23 | 900 | 18 | 97 | 98 | 18(84%) Total N |
| Hotel <small>15,000 GPD</small> | 622 | 17 | 101 | 19 | 97 | 81 | 6.9(83%) Total N |
| Restaurant <small>6,000 GPD</small> | 4271 | 75 | 4727 | 106 | 98 | 97 | 36(71%) Total N |

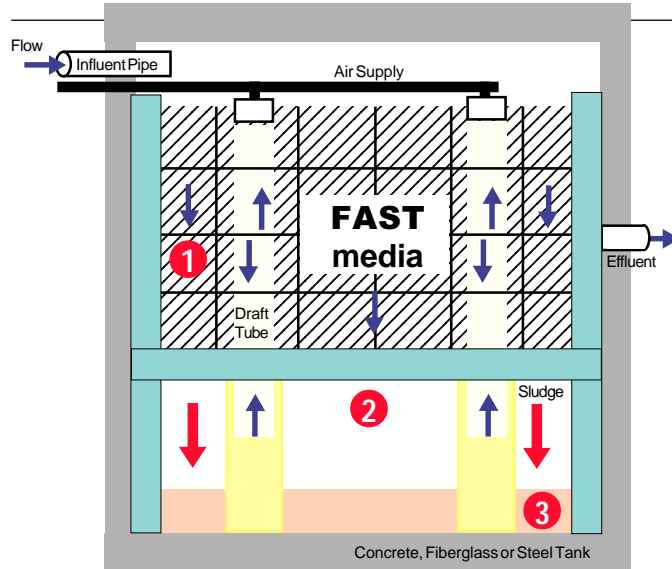
Because of the wide range of process wastewater applications, contact us directly at (800) 898-9122 or by e-mail at answers@smithandloveless.com.

How it Works **FAST**: 3 Treatment Processes In One Tank

With three treatment steps in one tank, Modular **FAST** is just plain smart for on-site, subsurface discharge and other wastewater treatment applications.

Influent from a septic tank enters the system and encounters submerged media in an aeration tank. Bacteria become "fixed" or attached to the media, enabling growth with a higher surface area-to-volume ratio, which prevents hydraulic shock loads from washing out the microbial population.

A zone underneath the media exists for the bacteria to slough off and settle for further digestion in an anaerobic environment. Modular **FAST** produces a secondary effluent that is significantly better than a traditional septic system.



simplified drawing

1 Aeration

The air supply and draft tube creates a vigorous, even circulation of the wastewater throughout the **FAST** media.

2 Clarification

Rapid settling of sloughed solids from the aeration zone, keeping sludge away from the media.

3 Anaerobic Digestion

Anaerobic conditions enable higher life forms to further digest settled sludge, lowering the need for sludge removal.

Superior PreTreatment

Whether the application requires pretreatment of sanitary or process wastewater for discharge to a city sewer, leach field, constructed wetlands or aeration pond, Modular **FAST** can do the job better than conventional pretreatment systems. Pictured at right is an installation, start-up and completion of a Modular **FAST** (at a hotel/restaurant) specifically designed for subsurface discharge into a leach field. This Modular **FAST** significantly extends the life of the hotel's leach field and meets stringent permit requirements unlike the previously used septic tanks.

- The operation of Modular **FAST** is very minimal, consisting primarily of air scouring of the media and occasional sludge removal (1 to 4 times a year depending on the application).
- Flow capacities for this kind of application are virtually unlimited.
- For industrial applications, pilot testing and leasing programs are available for customers with unique needs. Contact Smith & Loveless to discuss your water problems with our engineers today.

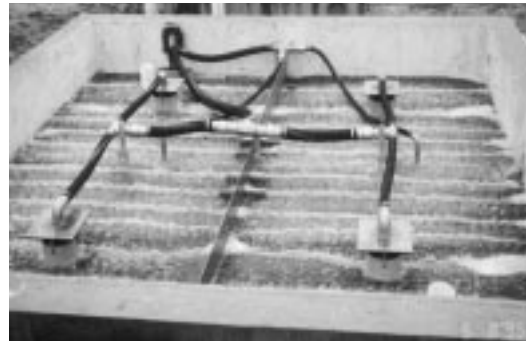
Installation and Operation of a Modular **FAST** System

Step 1



This system is easily installed into a small concrete basin.

Step 2



Wastewater circulates through media during start-up.

Step 3



*Modular **FAST** operates out of sight, under the parking lot!*

Municipal Applications

- Schools and Universities
- Housing Developments
- Office Parks
- Resorts and Hotels
- Botanical Gardens
- Shopping Centers
- Restaurants
- Golf Courses
- Parks/Campgrounds
- Municipalities

Industrial Applications

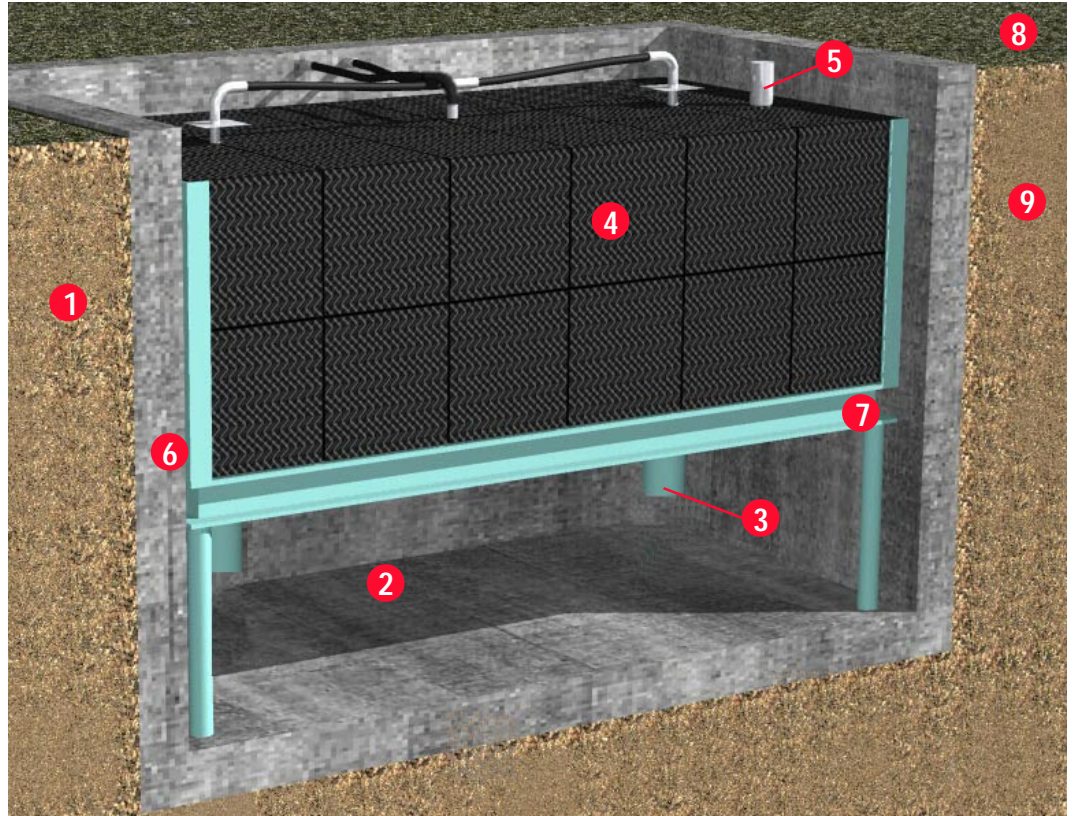
- Food and Beverage
- Wineries
- Groundwater cleanup
- Petrochemical/Chemical
- Aerobic Polishing
- Pharmaceutical

Retrofit Applications

- Increased Flow Capacity
- Nitrification/Denitrification
- Combination of Increased Capacity and Nitrification

*Similar smaller systems are available for domestic use. Contact Smith & Loveless regarding Single Home **FAST**® systems for individual homes.*

Modular FAST Design Features



Certified Worldwide

FAST was the first wastewater treatment system to obtain Canadian Great Lakes certification and among the first to obtain U.S. Coast Guard certification. The **FAST** system is also certified by International Maritime Organization rules under the UK department of Trade.

1 Influent Pipe

Carries wastewater directly from the septic tank and into the Modular **FAST** system. (Not shown)

2 Solids Collection Zone

Keeps sludge away from the media to allow effective circulation of liquid through the media. Anaerobic conditions digests sludge further.

3 Draft Tube

Works in concert with air supply to disperse the liquid evenly over the surface of the **FAST** media, providing continuous circulation of the wastewater. Because the bacteria grow on the media, the liquid is essentially clear and free of suspended solids, which differentiates Modular **FAST** from conventional activated sludge systems.

4 FAST Media

Provides a fixed site for the bacteria in an environment ideal for rapid bacterial growth (oxygen and food are equally distributed to the bacteria coated on the media). Allows long sludge age and low sludge production. The high surface-to-volume ratio ensures a large number of bacteria are available for metabolizing the waste. Produces a continually high level of treatment.

5 Sludge Withdrawal Pipes

Provides convenient access to sludge for periodic testing and removal of settled sludge.

6 System Tank

Any concrete, steel or fiberglass tank that is suitable for the application. Steel tank can be provided by Smith & Loveless.

7 Module

Packed with bacteria laden media, the base maintains the necessary structural support.

8 Blower

Supplies oxygen for the bacteria to grow and multiply. Can be located up to 100 feet away in a low traffic area. The blower is the only moving mechanical part of the system. (Not shown)

9 Odorless Effluent

Contains very low BOD and TSS levels, discharging into the existing leach field, lagoon, disposal well, constructed wetlands or sewer. (Not shown)

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Solutions for a world of water problems

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