

effluent to the environment. The pre-engineered, fixed-film media never needs changing or cleaning and prevents bacteria from being flushed out with the clean effluent during times of peak usage.

FAST[®] systems are pre-engineered, turnkey solutions for decentralized treatment of 500 to 160,000+ gal (.5-600 m³/D) of wastewater per day. A variety of available systems are pre-engineered for specific applications including RetroFAST[®] (for enhancing or repairing septic systems that are underperforming or have biologically failed), MicroFAST[®] (available in eight sizes for residential service), HighStrengthFAST[®] (for commercial properties) and MyFAST[®] (larger systems for communities, commercial properties). All FAST[®] systems use multiple biological, bio-chemical, chemical and physical processes simultaneously to reduce levels of nitrate and all other nitrogen species at exceptionally high percentage rates.

Despite the predictions of the 1800s, decentralized wastewater systems continue to serve not only individual homeowners but neighborhoods and communities, industrial plants, and other large customers. Technological advances have multiplied the effectiveness of treatment methods, while enabling greater ecological protections that meet demands for sustainable practices from the homeowner to the community and beyond.

About the Sponsor

Bio-Microbics has decades of real-world operating history with more than 60,000 installations in over 70 countries, where the reclaimed water produced adheres to water efficiency standards in the Coding Guidelines for most "Green" building certification programs.

Bio-Microbics products are an integrated water strategy for the rural/urban environment. Tested and certified by many national and international programs, they provide long-term operational performance with easy, low-cost maintenance.

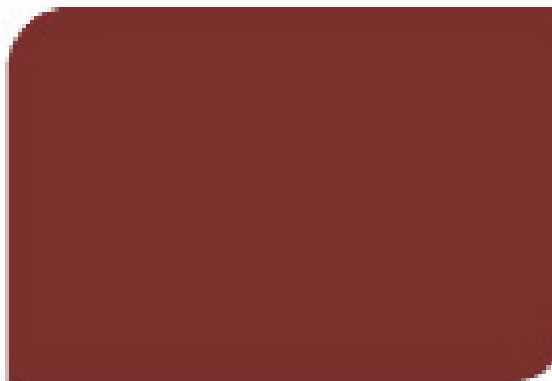
With their worldwide distributor network Bio-Microbics has been recognized as a leading exporter of decentralized wastewater treatment equipment. In 2011, they were honored to receive the Kansas Governor's Exporter of the Year Award and then the 2012 President's "E" Award and the 2016 President's "E Star" Award for Excellence in Exports. With our worldwide emphasis on environmental concerns and improving water quality Bio-Microbics' pre-engineered, pre-packaged and certified "Fixed Integrated Treatment Technologies" (FITT[®]) are the result of decades of real-world operating history and proven results that offer significant environmental benefits... "FITT[®] for the purpose intended".

Decentralized Wastewater Treatment

Leading the Way to a Sustainable Future



White Paper



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Clean, safe water continues to be a concern for many people around the world. Depletion of groundwater resources, population growth and an aging infrastructure are key issues, along with increasing water usage in the energy sector as production keeps pace with industrial and residential needs.

Conventional municipal wastewater treatment systems are often a one-way path that pumps fresh water over long distances to homes and commercial customers. After the fresh water has been used it's pumped through the sewer system to wastewater treatment facilities. After treatment, water is pumped through more pipes to a river or other body of surface water. Even scaled to the needs of smaller communities the design, construction, and overhead of conventional systems can be a significant financial burden to the areas they serve.

From the 1800's when septic tanks began to be used there had been an assumption that eventually individual solutions would be replaced by connections to larger systems. Over the years, as that did not happen as widely as expected, a variety of differing state and local regulations were developed. Unfortunately, practices and understanding did not keep pace with the development of new technologies and many decentralized systems were designed, operated, and maintained based on outdated regulations and information. As a result of evolving research yielding more capable alternatives in decentralized systems, the EPA concluded in a major 1997 report to Congress that properly maintained onsite wastewater treatment systems are a fully viable cost-effective alternative to sewer systems. At the same time, a study by the United States Department of Commerce and the Census Bureau found that as many as 20% of all onsite systems, due to age or other factors, were not treating waste adequately.

Today's leading decentralized wastewater systems have closed that gap between capabilities and performance. These systems are pre-designed for collection, treatment, and dispersal/reuse of wastewater at or near the point of waste generation. Often thought of as consisting solely of small flow systems serving rural homes, decentralized wastewater systems are also ideal for neighborhoods, isolated communities, commercial properties, industrial facilities, institutional facilities, and even maritime applications such as vessels at sea and offshore platforms.

For scale, consider that decentralized systems serve approximately 25% of the U.S. population. Although most common in rural areas, more than half of the 25 million decentralized systems are located in suburban areas and one-third of all new housing and commercial development uses decentralized systems.



Bio-Microbic's BioBarrier® membrane bioreactor uses robust biological processes and membrane-controlled separation to treat wastewater to a very high standard.

As a commodity and a resource, water is unlike minerals, natural gas, and oil. Companies that search for and extract those resources enjoy ownership rights to what they find and produce. Water is different because it's considered a publicly held resource. Although 73% of United States land is owned or managed by the private sector, people and communities seldom actually own the water they access, making private sector investment less likely.

Fortunately, there are several collaborative partnerships between political and institutional jurisdictions managing and funding programs to ensure limited water resources are used efficiently, sufficient quantities are available to protect and restore the environment, and supplies will be able to meet new demands. As an example, in 2005 the EPA established a Memorandum of Understanding (MOU) with eight public and private organizations to improve performance of decentralized systems and protect public health and water resources. That MOU expanded to include 18 organizations by 2014, and continues to encourage collaboration between the EPA, state and local governments, and the providers of decentralized wastewater systems and services.

The majority of modern decentralized systems return treated water directly to the local environment where it is further purified by filtration through the soil while replenishing water supplies, instead of discharging it to surface waters. More advanced systems also enable customers of all types to supplement or replace potable water for washing cars, for lawn and garden irrigation, for flushing toilets, and for many other tasks. Bio-Microbic's BioBarrier® membrane bioreactor uses robust biological processes and membrane-controlled separation to treat wastewater to a very high standard, allowing both greywater and blackwater to be reused in accordance with the NSF-350 certification.

A major advantage of decentralized systems is flexibility. In installations around the world, systems from Bio-Microbics have demonstrated that a modular approach provides simple, cost-effective expansion to meet increasing demands. In cases where a developer would normally incur the expense of designing and installing a complete centralized system at the early stages of a project, Bio-Microbics' decentralized approach allows the system to be sized for expansion, adding homes or groups of homes as they're completed.

In conventional septic systems as most people have known them, as little as 10% of treatment actually occurs in the tank. Bio-Microbics' FAST™ (Fixed Activated Sludge Treatment) systems use fixed integrated treatment technology (FITT®) to physically and naturally reduce pollutants. The FAST® system keeps the "friendly" bacteria alive to remove organic material, pollutants, and viruses from the wastewater. More than 90% of treatment occurs in the tank, releasing cleaner