

Water Technologies & Solutions

solutions for the biosolids industry

Monsal* anaerobic digestion technology



ready for the resource revolution



suez

what SUEZ offers

SUEZ's line of Monsal sludge processing systems brings advanced anaerobic digestion technology to the biosolids industry. Municipalities produce biosolids from wastewater sludge and can employ advanced anaerobic digestion systems to treat their biosolids.

Designed to recycle biosolids into methane and valuable byproducts, SUEZ's line of Monsal digestion processing systems use bacteria in the absence of oxygen to break down matter to create biogas. The biogas can be combusted or oxidized and used for heating or with a gas engine to produce electricity and heat. It can also be compressed and used as fuel for vehicles; additional nutrient-rich effluent can be used as fertilizer.

the process

Desludging operations normally provide the feed to any sludge treatment process. Desludging, which refers to the removal of primary sludge and humus sludge from settlement tanks, is one of the first stages of the overall flowsheet. SUEZ's Monsal AirLift system automates this solids removal from multiple tanks. By injecting air into the riser of the sludge pipe, a differential pressure is created that induces a flow. Sludge is then available for thickening operations prior to anaerobic digestion. The system is very simple—low energy, low operational input (maintenance), and low cost. Alternatives tend to be pumps, which incur higher CAPEX and OPEX costs.

Once in the digester, SUEZ's Monsal mixing technology is designed to handle thick sludge with low overall energy consumption. SUEZ's Monsal Sequential Gas Mixing (SGM) system offers the lowest parasitic power of any digester mixing system, particularly for thick sludges and sludges from advanced digestion processes. All of the moving parts of this mixing system are located outside of the sludge tank, providing easy access for servicing equipment. SUEZ's pump/jet mixing systems require more energy than the SGM but are also available for suitable digester configurations.

SUEZ's lines of heat exchanger equipment are specifically designed to handle thick sludge and difficult duty applications. Each product utilizes available on-site sources to provide maximum energy transfer to the sludge. The Re:Heat concentric tube system uses a closed water loop for heating applications, while the Re:HeatS direct

Advanced anaerobic digestion systems can be retrofitted to most traditional anaerobic digesters including the following process configurations: mesophilic anaerobic digesters, thermophilic anaerobic digesters, two acid stage digesters, advanced digesters using biological hydrolysis, and advanced digestion using thermal hydrolysis. The retention time experienced with advanced technologies—12 to 20 days—is significantly lower than that experienced with traditional processes.

SUEZ's line of Monsal advanced anaerobic digestion systems are the key part of a comprehensive offering to SUEZ's wastewater treatment customers that promotes optimal energy balance and energy neutrality in everyday operations.

steam injection system is utilized for high heat transfer duties where steam is available. The Re:Cool and Re:Cover systems cool and recover heat after our pasteurization processes. The Re:Smart is a packaged system designed to independently control digester temperature within strict operation parameters. These products are ideal for pasteurization and digester heating/cooling applications.

The digestion process itself is optimized using SUEZ's Monsal advanced pretreatment digestion processes. SUEZ's Monsal Advanced Digestion Technologies have developed multiple biological hydrolysis pretreatment systems to condition the sludge before anaerobic digestion. By heating the sludge to different temperatures and holding it for specific retention times, the sludge is conditioned to yield maximum results in the anaerobic digesters. Benefits include: increased digester capacity, maximum volatile solids destruction, and increased biogas production. Each process provides a level of stabilization for the sludge to meet Class A or Class B standards. After digestion, the sludge volume decreases and sludge dewaterability improves.

When combined, these individual components comprise a holistic solution that advances traditional anaerobic technology. SUEZ offers its Monsal Advanced Digestion Technologies as a solution provider or on an a la carte basis. SUEZ has experience in upgrading complete digestion facilities and has supplied individual components to complement other anaerobic digestion technologies.

why Monsal advanced digestion technologies:

- **Full system approach** – SUEZ maintains a long-established commitment to quality, value, and performance for our customers. We take an integrated system approach, not an individual component approach. All components of the advanced anaerobic digestion process are designed to work together as one system—each relying on the other—to help customers increase efficiency and reduce energy costs. SUEZ's expertise and techniques also allow us to continually assess system components and overall system performance and fine tune as necessary to meet changing operator demands.
- **Optimal energy balance maximizes system yield and performance** – One of the benefits of taking a full system approach is that it gives SUEZ an intimate understanding of system operations and allows for effective maintenance planning. SUEZ's line of Monsal advanced anaerobic digestion systems are made to fit unique and individual customer needs. The process starts with a comprehensive project assessment and continues with the design and installation of a system that optimizes efficiency and maximizes yield for gas output and/or heat energy going back into the system. Creating a system that produces the same—if not more—energy than it requires allows customers to significantly lower operating costs and reduce waste in the overall sludge processing process.



- **Mixing equipment achieves >90% active volume in sludge digesters** – Designing for efficiency is key; energy waste among individual components leads to underperformance, which throws off the energy balance and creates a system that requires too much energy. With this in mind, SUEZ's Monsal mixing equipment is designed to process more than 90% of the contents in the sludge digester. This creates a larger active area in the sludge digesters, which means the system footprint can be decreased and the customer can still produce the same amount of biogas.
- **Smart heat exchangers for thick sludge** – Heat exchangers play an important role in the anaerobic digestion process and take a lot of wear and tear as part of the overall system. SUEZ's heat exchangers are specifically designed to handle thicker sludge and different process duties. These heat exchangers promote a steady state temperature within the digester, leading to better system control and increased yields of gas. SUEZ provides sludge heating and cooling systems utilizing hot water or steam to transfer energy.
- **Cutting-edge pasteurization technology for Class A sludge processing** – SUEZ employs an advanced pasteurization process that kills harmful biosolids bacteria at a lower temperature than traditional anaerobic digestion technology. Pasteurization is achieved at a lower overall temperature and in unison with biosolids digestion.

growing opportunity

By providing customers with a cost effective, relatively low maintenance way to turn sewage sludge into electricity, SUEZ is putting companies one step closer to energy neutrality.

The Monsal suite of products allow SUEZ to develop and implement comprehensive and holistic advanced digestion solutions. These products effectively process organics and generate renewable energy that can be used to power the very facility that's processing the waste.

For example, a city of 500,000 people produces roughly 75,700 tons of household and commercial food waste and 14,600 tons of sewage sludge. By treating that waste through advanced anaerobic digestion, the value of the methane byproduct would produce about 5 MWe of electricity alone—enough to power 10,000 houses.

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GEA31607 Dec-14

