VEOLIA

Solutions for the biowaste industry

Monsal* anaerobic digestion technology

WATER TECHNOLOGIES

What Veolia Offers

Veolia's line of Monsal digestion systems brings advanced anaerobic digestion technology to the biowaste industry. Biowastes include organic food wastes generated from restaurants, supermarkets, commercial facilities, and institutions. They also include source separated organic wastes (SSOW) collected from residential homes.

Designed to convert biowaste into methane and other valuable byproducts, Veolia's line of Advanced Digestion Technologies uses anaerobic digestion to break down matter and create biogas. The biogas can then be utilized to produce renewable energy either in the form of renewable electricity and heat when combusted in a combined heat and power engine, or upgraded to biomethane for either pipeline injection or further compressed and used as vehicle fuel. Nutrient-rich digestate from the digestion process can be beneficially reused as fertilizer.

Veolia's line of Monsal Advanced Digestion Technologies are the key part of a comprehensive offering to Veolia's wastewater treatment customers that promotes optimal energy balance and energy neutrality in everyday operations.

The Process

The first stage of the advanced anaerobic digestion process involves separating food waste from contamination to recover organic material that can be fed into the digester. This is known as pre-treatment and is achieved with Veolia's RE:Sep*de-packaging system. This fully automated system separates packaging, contraries and grit (glass, bones, metal, etc.) to generate a clean organic slurry prior to digestion. The process can capture more than 95% of the organic material and removes all of the non-digestable material upstream of the digestion process. It is a key step that ensures all downstream equipment is protected from contaminants. To control odors, this pre-treatment process is contained in its own building and employs Veolia's De:Odour* biofilter.

After pre-treatment the organic slurry heads to a hydrolysis buffer tank. This tank is equipped with Veolia's JetMix system and serves multiple functions, one of which is to provide liquid storage capacity for the operational schedule of the receiving and separation process. The tank operates anaerobically and promotes the natural formation of volatile fatty acids in the slurry.

From the hydrolysis tank, the slurry is pasteurized (if legislation requires) in the Monsal 70 Process. The Monsal 70 is a three tank batch system designed to hold the sludge at 70°C for one hour to meet time and temperature regulations. Heat is either provided from a CHP engine or from a boiler system. Once pasteurized, heat is recovered from the discharge sludge and transferred to incoming sludge. As necessary, pasteurized sludge destined for digestion is further cooled to maintain the optimal mesophilic temperature. A key feature of Veolia's Monsal Advanced Digestion Technologies process is the stable heat balance, which enhances the available excess heat for export.

From here, the hydrolysed slurry moves into the digestion stage. The anaerobic digestion system is designed with a hydraulic retention time of 18 to 22 days to maximize the conversion from sludge to energy. The tank is equipped with Veolia's Sequential Gas Mixing System (SGM) to provide the lowest mixing energy for the high concentration sludge. The SGM pulls biogas from the digester, compresses it, and provides high localized mixing through a manifold on the digester floor. There are no internal moving components in the digester for easy operation and maintenance.

After digestion, the slurry can be treated further via dewatering to produce a valuable cake byproduct. The high strength wastewater can then be treated using a Veolia advanced aerobic process and the treated wastewater recycled. Alternatively, liquid digestate can be recycled directly depending on the local situation.

The biogas from the digestion process is stored in a gas holder and can be sent directly to a cogeneration unit or be prepped for additional processing for pipeline or compressed natural gas applications.

When combined, these process stages comprise a holistic solution that takes anaerobic treatment of biowaste to a new level. While full system solutions are preferred, Veolia offers its anaerobic technology a la carte, meaning individual components can be provided to complement other anaerobic digestion technologies.

Why Monsal Advanced Digestion Technologies:

- **Full system approach** – Veolia 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. Veolia'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 Veolia an intimate understanding of system operations and allows for effective maintenance planning. Veolia'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, Veolia'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. Veolia'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. Veolia provides sludge heating and cooling systems utilizing hot water or steam to transfer energy.
- **Cutting-edge pre-treatment technology for slurry processing** – Veolia employs advanced pre-treatment and pasteurization technology that produces a clean organic fraction and kills harmful biosolids bacteria. Our pre-treatment technology means that an exacting standard on the quality of the organic byproduct can be met both in terms of low contamination and pathogen levels. In addition, Veolia's Monsal Advanced Digestion Technologies process maximizes the available amount of heat for export due to efficient heat recovery systems.

Growing Opportunity

Veolia's Monsal Advanced Digestion Technologies is widely used by waste recycling companies, food producers, municipalities, and renewable energy producers. By providing customers with a cost effective, low maintenance way to turn food waste into electricity or renewable natural gas, Veolia is putting companies one step closer to energy neutrality.

The Monsal suite of products allows Veolia to develop and implement comprehensive and holistic advanced digestion solutions that 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 per year. By treating that waste through advanced anaerobic digestion, the value of the methane byproduct used in one of Veolia's gas engines would produce 5 MWe of electricity—enough to power 10,000 houses.

Resourcing the world

Veolia Water Technologies
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