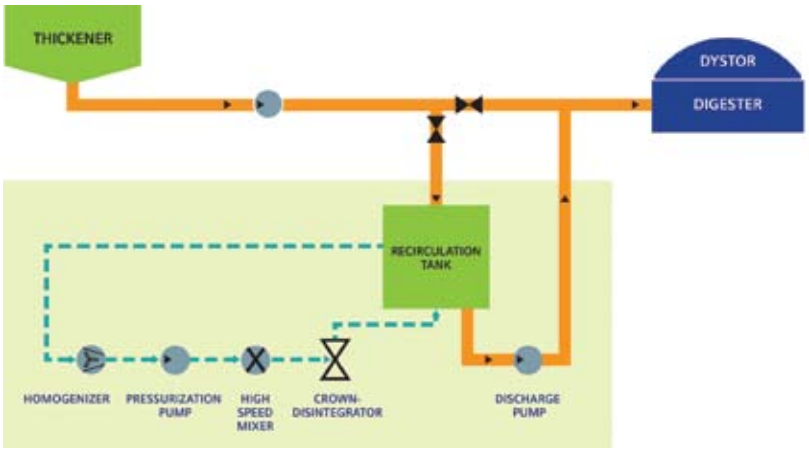
Sludge "Disintegration" System Reduces Disposal Costs



The Crown sludge disintegration system process flow.

Siemens Water Technologies has begun marketing a new sludge processing system that uses a patented cell lysing process to help eliminate digester foaming, reduce solids for disposal by 20%, and increase biogas production by up to 30%. Siemens is the North American supplier and service provider of the Crown® sludge disintegration system, manufactured by Biogest AG of Germany. The process is already operational at wastewater treatment plants worldwide.

The system is designed to treat waste activated sludge. It consists of a progressive cavity pump to pressurize the sludge to 175 psi, a homogenizer, a disintegrator nozzle assembly, recirculation tank, discharge pump, and touch panel control. All components are pre-assembled and tested in the factory and require only electrical and sludge connections onsite.

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The system is installed after sludge thickeners but before the digester. Sludge is first fed into the system's recirculation tank. It then goes through a homogenizer. A progressive cavity pump pressurizes the uniform mixture to 175 psi and then pumps it through a high-speed mixer and into the disintegrator. As the pressure is relieved, the biosolids cells rupture, release endo- and exo-enzymes, and destroy filament-building micro-organisms. The disintegrated sludge is then sent back to the recirculation tank, where the process is repeated before being discharged into the digester.

The progressive cavity pumps are fitted with pressure regulators to accommodate variable sludge viscosity and internal pump wear. This ensures the cell rupturing process is stable and not sensitive to variable sludge loadings. The control panel incorporates a user-friendly operator interface in color. The entire process is controlled using a Siemens SPS (S7) PLC.

System Benefits

The Crown sludge disintegration technology can prove beneficial for municipal utilities in areas with green energy incentives and self-generation incentive programs, as well as for municipalities that have high-volume biogas end-users. Existing customers with co-generation facilities can also pair the unit with Siemens' Dystor® gas holder system to maximize system potential through increased gas production and storage.

Compared to a competitive physical/chemical cell lysing process, the smaller footprint Crown process consumes less energy and reduces chemical, equipment, and sludge hauling costs. Pre-fabricated and containerized for simplified installation, the process is adaptable to variable loads, improves sludge dewaterability, and requires no specialty skills to maintain as the system contains components normally found in a WWTP.

For the first year after installation, Siemens will remotely monitor the system for influent sludge characteristics, pump frequency, and pressure of the cell disruption process. Monitoring will also cover the adjustable parameters and fault reporting to ensure system optimization. In the event of a fault, the company can use the monitoring system to assist the operator. It is also possible to remotely alter the software and operation of the system, therefore minimizing costs and downtime.

The Crown system can be tailored to suit individual plant requirements. Because not all municipal sludge is alike, each disintegration system is sized based upon the sludge influent to the digester. Factors such as solids concentration, organic load, and others are considered for a constant maximum of 30% influent to the digester. Pilot testing done in Europe indicates that the best financial return can be achieved by treating this percentage of the sludge volume for digestion.

Payback is calculated by adding transportation and disposal cost savings to the revenue stream from selling biogas-generated electricity back to the grid.

To learn more about the Crown sludge disintegration system, contact Tom Mangione at thomas.mangione@siemens.com.

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