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HIGH-LOAD DIGESTION
LARGE-SCALE INSTALLATION FOR MUNICIPAL WASTE SLUDGE

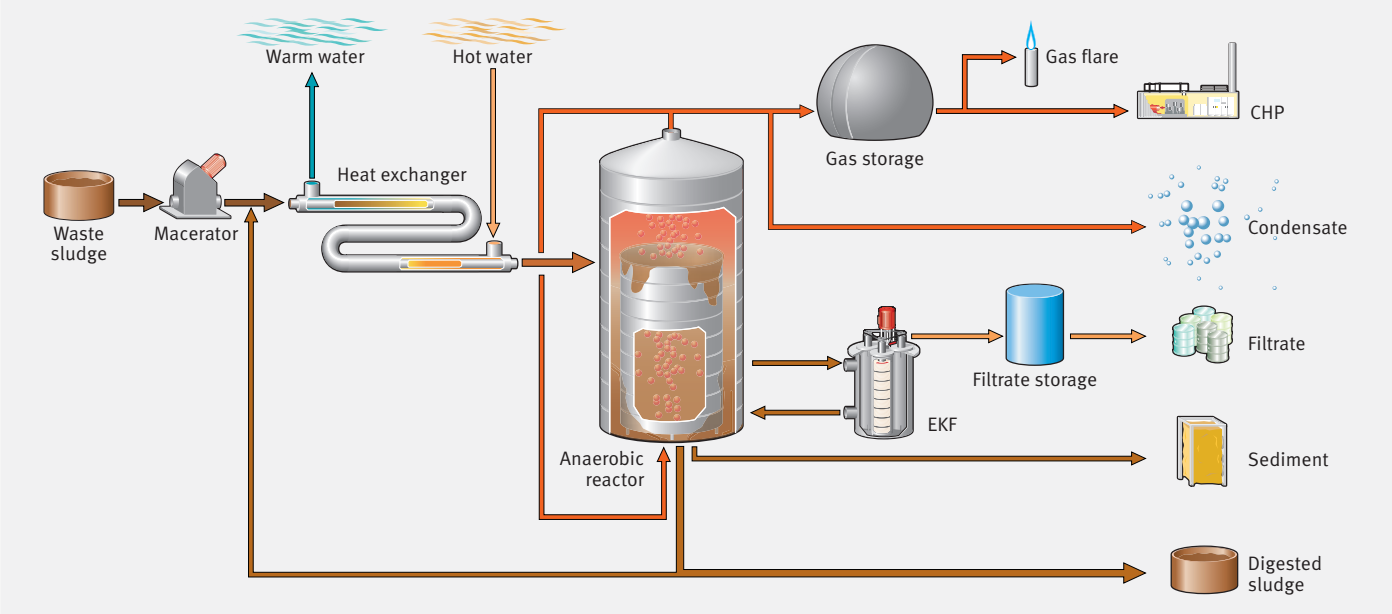
THE ADVANTAGEOUS PROCESS DEVELOPED BY THE FRAUNHOFER IGB FEATURES LOWER CAPITAL INVESTMENT, HIGHER THROUGHPUT AND BIOGAS YIELD AND LOWER RESIDUAL SLUDGE VOLUMES THAN CONVENTIONAL DIGESTION.

In conventional plants for the treatment of municipal waste water, organic content in the biomass is converted to sewage sludge and then removed from the waste water. Sewage sludge is normally digested for sanitization and to reduce its volume. The size of the reactor chamber is determined by the required retention time of the solids. This approach increases sludge concentration by filtering it out of the water, reducing the necessary reactor volume. The smaller reactor surface area lowers heat losses, lifting both the specific decay rate and the specific biogas yield. This cuts the residual sludge quantity accordingly.

High-performance digestion with ceramic filter

To increase the sludge concentration, a biotechnology process developed in partnership with the Fraunhofer Institute for Interfacial Engineering and Biotechnology (IGB) is employed. In this process, sludge is flung from the membrane by means of rotation, even with high sludge concentrations. This enables a high flux for anaerobic sludges to be achieved.

Membrane filtration yields a clear filtrate, and highly concentrated, high-quality phosphate and ammonium nutrients can be recovered from it. Similarly, the filtrate water is ideally suited to reuse.



High-load digestion process.

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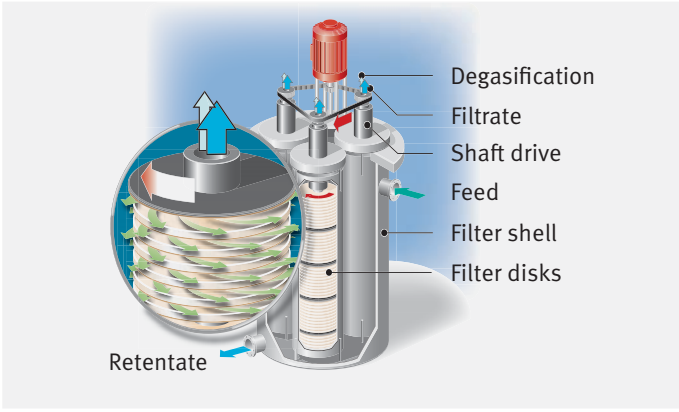
The loop reactor is frequently employed for anaerobic digestion processes and requires very few internals, is extremely robust, and cannot be blocked by hair or other matter. Even sand does not pose a problem. The insulated reactor consists of high-quality stainless steel and is erected on a concrete foundation.

The installation described here has been implemented on a large scale, mainly due to its cost-effectiveness. Electricity production by a downstream cogeneration plant not only meets all of the digester's energy and heat requirements, it significantly reduces the power consumption of the entire treatment facility. And the process is eminently suitable for treating lower volumetric flows of industrial process water containing organic contaminants, in combination with energy production.

Advantages at a glance

- Reactor volume far smaller than conventional digester towers (only one-third as large)
- High flux of the rotating disk filter despite the challenges of the medium
- Recovery of nutrients from the filtrate, which contains no solids
- Filtrate water can be reused as process water
- Lower capital investment for high-load digestion compared to conventional systems



An anaerobic ECF.

Picture of membrane stack.

Assemblage of a loop reactor.

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