Application Brief

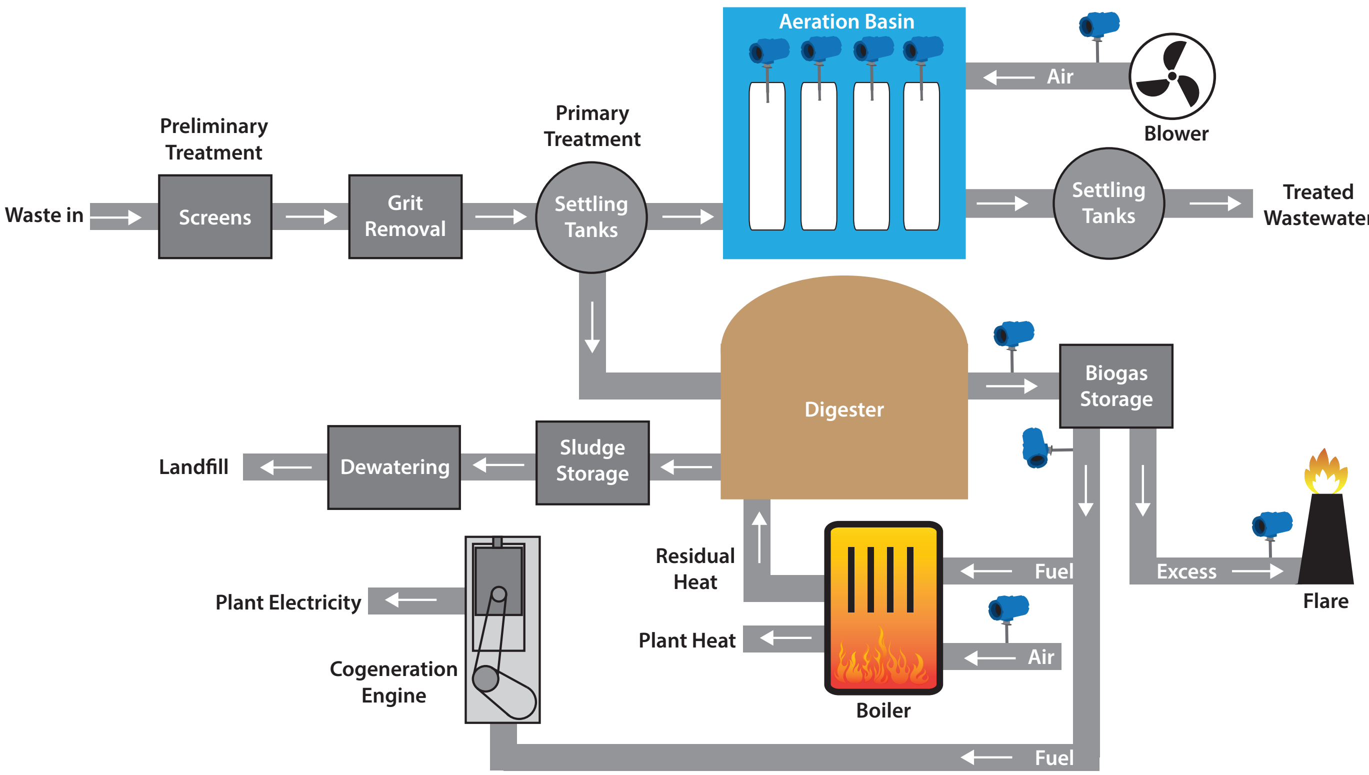
Wastewater

Wastewater plant

Wastewater treatment plants (WWTPs) or publicly owned treatment works (POTWs) must operate 24/7 in order to meet treatment demands from domestic, industrial, and storm drain sources. Sewage treatment involves removing contaminants from wastewater and sewage (human waste, food waste, soaps, and detergents) to produce a safe fluid waste stream that can be safely re-introduced into the environment and a solid waste suitable for reuse (typically as fertilizer). The primary applications for flow meters in the wastewater environment are measuring blower air to each pool in the aeration basin and measuring digester gas flow.

- The aeration basin is a series of treatment pools containing aerobic bacteria that feed and breakdown the sewage moving through the pools. A blower adds the required dissolved oxygen (DO) to maintain the aerobic bacteria in the aeration basin. Too little oxygen kills the bacteria and too much oxygen is expensive; operating the aeration blower accounts for up to 60 percent of all power consumed at a wastewater site.
- The sewage within the digester is called "sludge." Bacteria is added into the digester where it breaks down the sludge. The digester gas is collected, compressed, excess moisture is removed, and then further cleaned in a scrubber. The cleaned gas is sent to engines or fuel cells used for generating electricity, for heating the boiler water (for steam or hot water), and excess gas is sent to the flare. Many large sewage treatment facilities use digester biogas to run the facility, keeping their power use from the grid at a minimum.

Wastewater



Simplified Wasterwater Plant

The requirements for monitoring the aeration basin include:

- Improving energy management for containing operating expenses.
- Stabilizing the DO content to maintain an optimal bacteria environment.

Correcting for temperature and climate factors. The challenges in measuring digester gas include:

- There is a large amount of condensing water present in the system.
- Variable flow rates due to changing loads.
- Daily and seasonal temperature variations interfere with reliable gas monitoring and measurement.
- The presence of hydrogen sulfide challenges the integrity of the sensor.

A sensor used to monitor the biogas output of the digester can provide an indicator to efficiency of the digester. Developing accurate flow rate data allows wastewater treatment facilities to more precisely manage digester production levels, enabling tighter controls on methane levels and flaring. This can make facilities more efficient in meeting peak flow and load conditions, which vary based on population changes or wastewater sources. It is also important to monitor the gas coming out of the digester to ensure the digester health levels are optimally maintained and that greenhouse gas emissions can be accurately reported.

Flow metering applications include:

- Header (blower) air flow
- Individual pool air flow in the aeration basin
- Digester gas production
- Precombustion engine fuel flow
- Air/fuel to boiler or engine
- Flare gas flow

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