



FCI ST98L

Digester Gas and Natural Gas Blending for Cogeneration Power Production

Application Note Case Study ANCS011

A progressive municipal wastewater treatment facility installed co-gen engines to be fueled by the site's production of digester gas to generate on-site power for the facility. To sustain the BTU required by the engines in the event digester gas production is too low, the engines are supplemented with natural gas.

Problem

The engine's control system required flow measurement of both the digester gas and natural gas to control correct blend and mix to ensure proper BTU to engines to ensure efficient power generation. To minimize training and service/support costs, site engineering and maintenance staff preferred installing the same flow meter technology from common vendor for both the digester gas and natural gas lines. The flow meters must be able to measure and survive the continuous vibration of the engines and dusty/dirty installation.

Flow Conditions

- Media composition:
 - Digester gas: Methane (CH₄) 60 % + carbon dioxide (CO₂) 40 %
 - Natural gas: Methane (CH₄) 90 % + ethane (C₂H₆) 10 %
- Pipe diameter: Both 2" and 4" lines [DN50 and DN100]
- Flow rate: Up to 500 SCFM [14 NCMM]
- Temperature: 50 °F to 100 °F [10 °C to 38 °C]
- Pressure: 60 psig [4 bar(g)]
- Straight-run: 120 pipe diameters

Solution

The customer installed FCI Model ST98 constant power thermal dispersion flow meters in both digester gas and natural gas lines. For 2-inch lines [DN50] an "in-line" type was used and for 4-inch [DN100] lines an "insertion" type was used. There are no moving parts and it is not susceptible to vibration. The enclosure is NEMA 4X/IP66 rated and agency approved for installation in hazardous gas (Ex) locations. The FCI flow meter's standard 4-20mA analog output of flow rate was wired into the engine's control system.

Line Size ≤2" [DN50]

FCI Model ST98L

FCI Model ST100L

FCI Model ST75 or ST75V

Line Size >2" [>DN50]

FCI Model ST98

FCI Model ST100

FCI Model ST51

Benefits

- Achieve cost savings by applying same solution to both digester gas and natural gas.
- Best, most accurate control achieved with true mass flow measurement.
- Optimum accuracy with calibration matched for fluid and application conditions.
- Significant cost savings in service and maintenance expense.